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SINGLE STORY LAYOUT – EFFICIENT FORMAT FOR
DIGITAL MAGAZINE PUBLISHING ON TABLET
DEVICES

Master Thesis

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Ready for Defence: /Signed digitally/

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“So far, there isn't a single model for our kind of magazine that appears to work.”

Alexis Madrigal, senior editor at *The Atlantic*¹

¹Alexis C. Madrigal. A Day in the Life of a Digital Editor. 2013. Web. 7 May 2013:
<<http://www.theatlantic.com/technology/archive/13/03/a-day-in-the-life-of-a-digital-editor-2013/273763/>>

Summary

The aim of this thesis is to define digital magazine format characteristics and examine its influence on the reading experience. The motivation behind was to examine the viability of single story magazine concept -- publishing format for the mobile generation.

The field of research is digital publishing, focused primarily on magazines for tablet computers. Print magazine businesses and entrepreneurs with web publishing background both are approaching the new medium by experimenting with format, contents and distribution. The standards for the digital magazine formats have not yet been established, and the definition of digital magazine implies meanings within broad categories.

The study reviews print and digital magazine workflows analyzing variations of mutual integrations. Theoretical chapters also include revision of digital magazine format components and overview of authoring tools. Practical experiment was conducted to reveal usability problems in digital magazine formats. Two existing magazines are tested, digital version of traditional magazine and single story magazine representing unbundled publication. Mixed methods were chosen for usability testing – heuristic analysis, observation and evaluation questionnaire.

It was found that digital magazine readers prefer smaller volumes of content in comparison to print legacy formats. Research reveals that readers are not accustomed to magazine reading on tablets. Study also offers suggestions for improved usability and more satisfying reading experience concluding that single story magazines is a viable opportunity in digital magazine landscape, worth further investigation.

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Riga, May 7th, 2013.

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1. Introduction

1.1 Motivation and aims

As print magazine newsstand sales and subscriptions are declining, magazine publishers are looking for new opportunities to reach readers. Contrary to print media environments digital publications no longer depend on print production constraints—neither in volume nor publishing frequency. Still, traditional publishers are accustomed to print legacy workflows that significantly impedes innovation. Magazine publishers, specially the small ones, blame software tools vendors for setting high production costs and highly regulated distribution ecosystem.² It is also easy to assume that slow digital magazine market adoption relates to publisher's fear of losing money in uncertain markets.

However, new breed of publishers emerge without intention to print considering tablets as the main distribution channel. Tablet publishing pioneers like TRVL magazine are successfully publishing magazine articles as separate entities embracing advantage of the new medium. “TRVL, the first iPad exclusive magazine in the world and the only magazine with a five-star rating for 14 months in a row seems to be one of the only magazines that are getting it right. Being voted Best Magazine in the 2011 BestAppEver Awards, beating The New Yorker, National Geographic, Wired, Flipboard etc, just confirms that.”³

The main purpose of this study is to examine digital magazine layouts in order to determine efficient publishing format for tablet devices. Two existing digital concepts are tested, one that represents digital version of traditional magazine against unbundled magazine approach—single story publications.

While still looking for better business models, books and newspapers publishers are already embracing digital environments. The largest book retailer Amazon.com reported that digital

² Adam Blanks. Publishing enters a new Dark Age. MacUser. April 29, 2011. Web. 7 May 2013
<<http://www.macuser.co.uk/4858-publishing-enters-a-new-dark-age>>

³ TRVL beats National Geographic and Flipboard. Press release. February 10, 2012. Web. 7 May 2013
<<http://trvl.pressdoc.com/31503-trvl-beats-national-geographic-and-flipboard>>

books for the Kindle, its e-reader, already outnumbered sales of hardcover books. (May 19, 2011)⁴

More people are now getting news on cell phones, tablets or other mobile platforms—on the rise of social media sites digital news already surpassed newspapers (and radio)⁵ In January 27 2010 Steve Jobs introduces the first iPad which is considered as a revolutionary device that finally would serve digital magazine purposes connecting “ users with their apps and content in a much more intimate, intuitive and fun way than ever before”⁶. Meanwhile, digital magazine publishing still experiences stagnation. According to AAM report⁷ digital replica editions hold only 2,4 % of the total magazine industry average circulation.

Since digital magazine publishing is relatively new, there is not a lot of academic research done. There are two studies found, related to the field—research on digital magazine layout aesthetics and design evaluation analyzing differences between manual design and automated content aggregation. In this study general attention is paid to digital magazine format and layout disposition principles. Content entity structure and magazine consistency is analysed in order to assess its effect on usability.

1.2. Research questions

1. Which digital content units attract readers the most and how users set their reading preferences within the time frame.
2. How user habits (desktop computer, mobile phone browsing and real world experiences) affect digital magazine reading experience.
3. Does single story layout improves usability and perception of magazine contents compared to bundled editions.

⁴ Amazon.com Now Selling More Kindle Books Than Print Books. Press release. May 19, 2011. Web. 7 May 2013 <<http://phx.corporate-ir.net/phoenix.zhtml?ID=1565581&c=176060&p=irol-newsArticle>>

⁵ Pew Research Center for the People & the Press. In Changing News Landscape, Even Television is Vulnerable Trends in News Consumption: 1991-2012. September 27, 2012. Web. 7 May 2013 <<http://www.people-press.org/2012/09/27/in-changing-news-landscape-even-television-is-vulnerable/>>

⁶ Apple Launches iPad. Press release. January 27, 2010. Web. 7 May 2013 <<http://www.apple.com/pr/library/2010/01/27Apple-Launches-iPad.html>>

⁷ Alliance for Audited Media. Top 25 U.S. Consumer Magazines for December 2012. Web. 7 May 2013 <<http://www.auditedmedia.com/news/research-and-data/top-25-us-consumer-magazines-for-december-2012.aspx>>

1.3. Structure and methods

This thesis structure is organized in two parts, the first part is devoted to theory explaining the background of the research. Theoretical chapters examine conditions affecting digital magazine format including industry standards, business requirements, production workflow and technology restrictions from publisher perspective. This part also contains theoretical analysis of digital magazine layout and navigation structure. Second part documents empirical experiment examining two similar digital magazine editions, both covering the same field interest, maintaining equal quality of the material but representing different approach to magazine format and content distribution. The aim of the tests is to gather crucial properties and values from magazine reader perspective that defines digital magazine format efficiency.

To ensure credibility of findings, multiple methods are mixed—user interface heuristic evaluation, observation and questionnaire. Heuristic analysis is chosen as a method for qualitative measures of data taken from user observation while they are performing assigned tasks. Qualitative analysis supplements findings derived from user questionnaire, which is chosen as the second method for usability evaluation.

2. Digital magazine

2.1 Magazine publishing

Magazines are defined as regularly published storehouses of information. Magazine publishing has its roots in the spate of pamphlets, broadsides, ballads, chapbooks, and almanacs that printing made possible. These gradually became channeled into publications that appeared regularly and collected a variety of material designed to appeal to particular interests. The magazine thus came to occupy the large middle ground, incapable of sharp definition, between the book and the newspaper.⁸

The contemporary meaning of magazine can also be considered analogous to the former; a storing place for knowledge, ideas and opinions. A magazine is separated from a newspaper in many ways. They are not as topical as newspapers, but more in-depth and specialized: stories being features, not news.

2.2 Digital magazine standards

Until the first Ipad was introduced by Steve Jobs, digital magazine definition implied digital version of print issue by providing access to contents on a remote server or delivered in a file format using email. Alliance for Audited Media (leading North America's membership organisation of advertisers, advertising agencies and content providers) qualification standard states: "The label "Digital Edition" is used to describe the distribution of a magazine's content via electronic means. The digital edition must maintain the same identity of the host publication by maintaining the same name/logotype characteristics."⁹

After the first tablet computer had launched, Condé Nast, publishers of Wired magazine initiated the proposal to revise digital magazine definition. In March 16 2010, Alliance for Audited

⁸ History of publishing. The role of the press. Encyclopedia. Web. 7 May 2013
<<http://www.britannica.com/EBchecked/topic/482597/history-of-publishing/236528/The-role-of-the-press>>

⁹ Alliance for Audited Media. Qualification and Reporting of Digital Circulation. 2011. Web. 7 May 2013
<<http://www.auditedmedia.com/resources/guides-and-evaluation-forms/consumer-magazines/qualification-and-reporting-of-digital-circulation.aspx>>

Media presented new standards stating that a replica digital edition must include a print edition's full editorial content and advertising, but it no longer needs to be presented in a layout identical to the print version. As a result publishers could start reporting also tablet distribution averages and mobile application purchases.¹⁰

Since digital magazine production has print publishing origins, AAM has developed standards for digital replica magazines. Although guidelines strongly encourage to take advantage of new technologies, there is still noticeable restrictions regarding the content. To qualify and, therefore, to be admitted to submit circulation reports digital replica magazine has to meet several criteria. "A digital replica edition must include the print edition's full editorial content, including photography. In addition, any advertiser appearing in the print edition must have the opportunity to appear in the digital replica edition. The layout may be reformatted to accommodate different delivery devices. The full editorial and advertising content must still be presented in a manner consistent with the print edition."¹¹

1. Similar content implies:

- Complete articles
- Photo captions
- Photos
- Graphics
- Table of contents
- Contact information contained within the article
- Titles/headlines

Guidelines does not regulate visual enhancements (which are rather advisable) and supplemental units of content (photo, video materials, additional text captions) that takes advantage of the medium.

2. Similar advertisements (excluding small space advertising which counts less than 1/3 page in its print counterpart).

¹⁰ Alliance for Audited Media. ABC Board Revises Definition of Magazine Digital Edition. 2011. Web. 7 May 2013 <<http://www.auditedmedia.com/news/news-releases/2010/abc-board-revises-definition-of-magazine-digital-edition.aspx>>

¹¹ Alliance for Audited Media. Qualifying Your Magazine's Tablet Edition. 2011. Web. 7 May 2013 <<http://www.auditedmedia.com/resources/guides-and-evaluation-forms/consumer-magazines/qualifying-your-magazines-tablet-edition.aspx>>

ABC (Audit Bureau of Circulations), the industry body for media measurement in United Kingdom defines digital replica with slightly different characteristics:

“A digital edition is defined as an edition of the print publication published electronically as a unit, which once published is, as a principle, inert (i.e. does not change).(…) digital editions must carry a logotype/masthead incorporating the generic name of the parent publication and be consistent with the general appearance of the parent edition.”¹²

1. Content:

It's allowed to reduce the editorial by up to about 5% of the editorial carried in the parent edition.

Publishers are authorized to supplement additional editorial in the digital edition, up to about 25% more than the editorial in the parent edition.

2. Advertising:

A digital edition must carry all of the ROP (not classified) advertisements (by number and advertisers) that appear in the parent edition unless agreed otherwise with the advertiser/agency.

Since specific guidelines for tablet publications do not exist, new formats for the digital magazine publishing are defined by BPA Worldwide¹³ and now being discussed under the supervision of IFABC (International Federation of Audit Bureaux of Circulation). It suggests four types of digital magazine format:

1. Editorial Replica:

If a print brand existed first, editorial and design are unchanged from the original print edition. With a replica digital product, each issue's content and design are identical to the original edition. Apart from minor updates, the content cannot change once the issue is made available.

2. Replica Plus:

If a print brand existed first, “replica plus” is editorial that is retained from the original edition and is redesigned and/or supplemented, e.g. photo journalism, may be enhanced with audio, video or additional editorial. With a replica plus digital edition, each issue's editorial is primarily taken (but not necessarily replicated in its entirety) from the original edition (whether in print or

¹² Audit Bureau of Circulations. ABC Digital Publications Reporting Standards. 2013. Web. 7 May 2013
<<http://www.abc.org.uk/PageFiles/38/Digital%20Publications%20version%20%20January%202013.pdf>>

¹³ BPA Digital Circulation Auditing. 2012. Web. 7 May 2013
<http://www.bpaww.com/Bpaww_com/HTML/resources/2012/Digital_Auditing_FAQ.pdf>

digital). Editorial that is taken from the print version may be expanded upon in the “replica plus” version, but it may not be shortened. Apart from minor updates, the content cannot change once the issue is made available.

3. Targeted

Editorial is changed for specifically defined groups and/or platforms before point of delivery. With a targeted digital edition or publication, each group of recipients, whether they are segmented demographically or because of the platform they use to receive the digital product, receive a copy with different editorial specifically selected for that group. Apart from minor updates, the content cannot change once the issue is made available.

4. Dynamic:

Editorial can be created and/or selected at point of delivery. With a dynamic digital edition or publication, each recipient can receive a copy with different editorial and that editorial can change at any time.

There is no industry standard for digital-only magazines. In this study digital-only magazine is a digital publication with a beginning and an end with contents not derived from the print magazine primary targeted for distribution on tablet devices.

Alliance for Audited Media sets standards for the whole magazine publishing industry. As they are focused on existing market, digital magazine guidelines are derived from the print industry definitions. To be accepted as a digital edition of the print magazine, the contents must be similar with the print counterpart that significantly limits experiments with digital formats. Magazine publishers heavily rely on advertising revenue; therefore they must obey the rules to qualify for inclusion in circulation reports—crucially important dataset for advertisers.¹⁴

¹⁴ BPA Digital Circulation Auditing. 2012. Web. 7 May 2013
<http://www.bpaww.com/Bpaww_com/HTML/resources/2012/Digital_Auditing_FAQ.pdf>

3. Digital magazine format

Digital magazine format in the context of this study is a collection of characteristics of logical and physical content units within the structure constituting reader's path. (Figure 1)

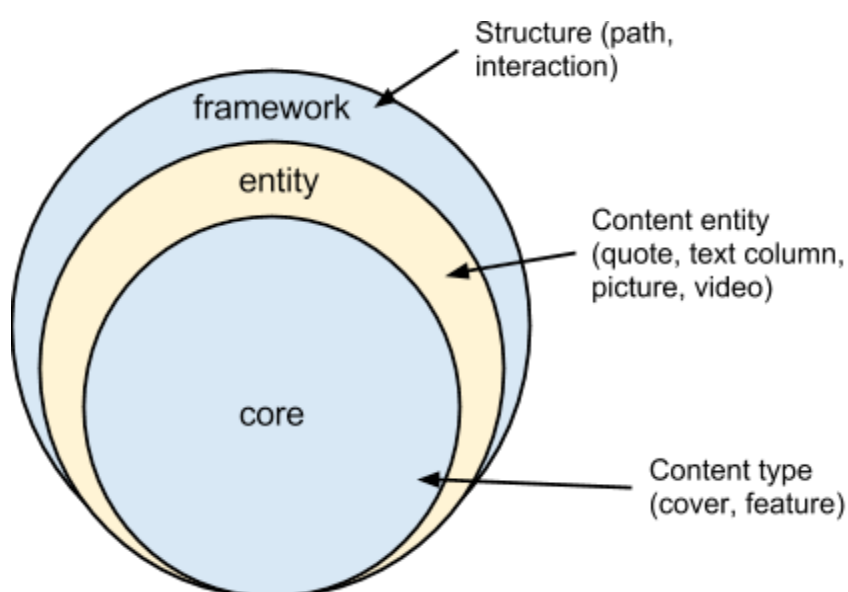


Figure 1

Digital magazine format framework

At the heart of every magazine is a story represented in the form of article. Bundle of articles forms the core of magazine usually connected to the main topic of the issue. Article components are different entities - headlines, quotes, captions, photos, illustrations. In digital magazine format, it is possible to add videos, animations and interactive features as article components. Finally, there is a path and navigation – predefined structure at the application level prescribing the ways content can be accessed.

3.1 Cover.

In the real world cover is a crucial element in magazine lifecycle. It serves marketing, discovery and sales functions. Cover designs also incorporate brand values and identity allowing readers recognize their preferred publishers and help quickly determine the main topics and contents of the issue.

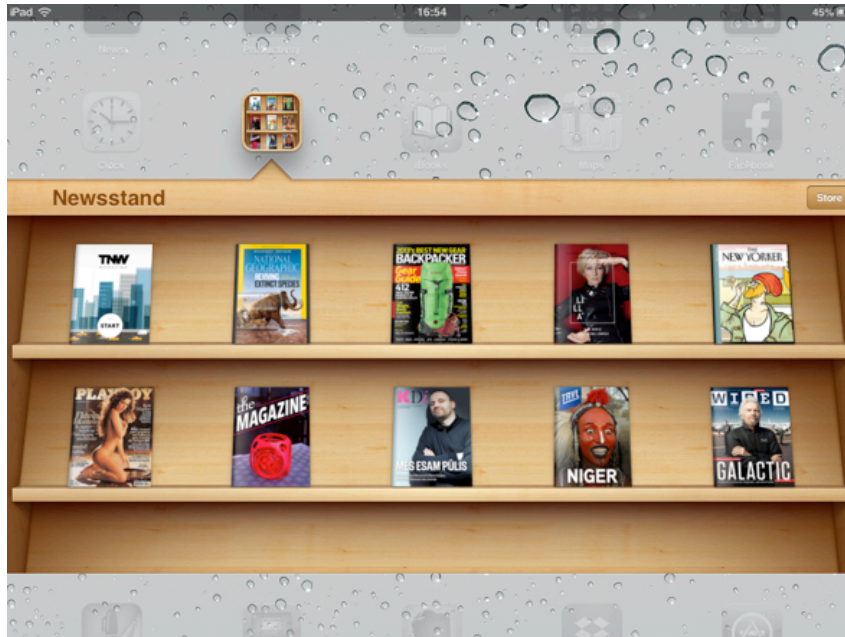


Figure 2

Apple Newsstand home. iPad screenshot.

Comparing to the real world newsstand, covers on Apple Newsstand are tiny little pictures having little in common with its print counterparts in form and meaning (Figure 2). Even more, in a tangible format, after the magazine leaves newsstand or is delivered to your door, it starts its own journey and the cover is the main attribute to represent the essence.

“We jump in and out of digital texts with little to no procession. In contrast, every time you set down a physical book, cover is staring up at you. And every time you pick it back up, you have to go “through” the cover to get to the text. Do that five times and you'll never forget the title or author.”¹⁵

¹⁵ Craig Mod. Hacke the Cover. May 2012. Web. 7 May 2013 <http://craigmod.com/journal/hack_the_cover/>

Craig Mod also suggests that cover functions should be incorporated to larger design systems connected with distribution and discovery networks by representing identity rather than artwork. “The classic notion of a cover made digital is more like a book's "favicon" rather than a gateway into the text. It is at best a small piece within a larger design system and at worst, never seen.”¹⁶

3.2 Structure and navigation

Every article is divided into pages (in this study page of digital magazine is defined as the amount of content fitting within screen dimensions, Figure 3). In print replica version, the magazine structure remains the same inheriting linear navigation structure. Depending on technology and tools used navigation path is organized either in vertical or horizontal direction. Digital edition provides more complex navigation structure where content is organized allowing the user to browse horizontally and vertically, often supplemented with scrolling options within frames inside the page.

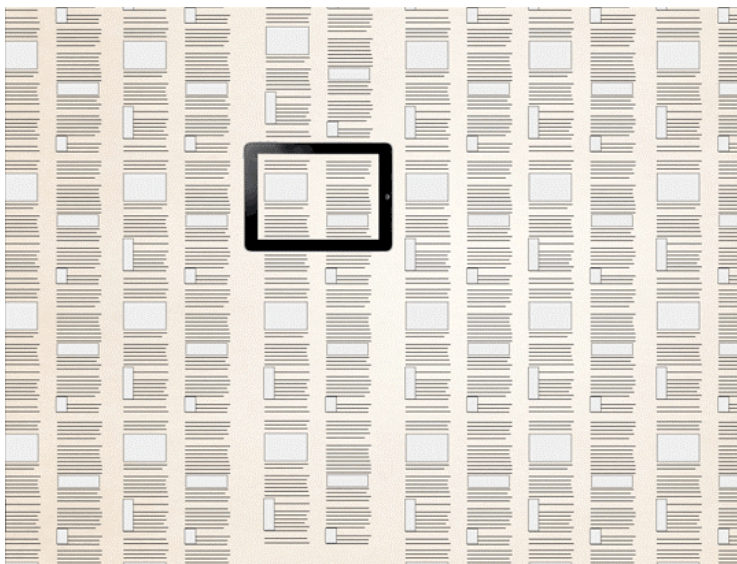


Figure 3

*"Infinite Canvas" Illustration by Scott Mccloud. Source:
<http://scottmccloud.com/4-inventions/canvas/index.html>*

¹⁶ Craig Mod. Hacke the Cover. May 2012. Web. 7 May 2013 <http://craigmod.com/journal/hack_the_cover/>

Bret Victor affirms that navigation implies state. “Software that can be navigated is software in which the user can get lost. The more navigation, the more ways to get lost.. The more manipulable state, the more ways to wander into a “bad mode.” State is the primary reason people fear computers – stateful things can be broken.”¹⁷

Navigating between windows perhaps the most disorienting kind of navigation involving a gross shifting of attention that disrupts the users flow and forces him into a new context. At the very least, it means that the user needs to worry about window management, an excise task that further disrupts his flow. If users must constantly shuttle back and forth between windows to achieve their goals, their productivity will drop, and their disorientation and frustration levels will rise. If the number of windows is large enough, the user will become sufficiently disoriented that he may experience navigational trauma, and he gets lost in the interface.¹⁸

Intended navigation through the story has crucial influence supporting the narrative. As Scott Mccloud notes “Page breaks set up of a rhythm which have nothing to do with stories they are in. When the pages fit the screen and navigating between them is intuitive, the problem is reduced, but most page implementations online are clumsy hybrids of printed page shapes and a smattering of scrolling and clicking that distract from the reading experience.”¹⁹

It is important to examine magazine layout from storytelling perspective. Linear narrative techniques are used to provide continuous and uninterrupted reading experience. Print magazine layouts are limited by physical space constraints. Content entities – pictures, text columns and captions are related to the story, but the way the bits of the story are laid out reinforces its non-linearity. Figure 4 analyzes reading experience interruptions caused by visual enhancements in a print magazine layout.

¹⁷ Bret Victor. Information Software and the Graphical Interface. 2006. Web. 7 May 2013 <<http://worrydream.com/MagicInk/>>

¹⁸ Alan Cooper, Robert Reimann, David Cronin. About Face 3.0: The Essentials of Interaction Design.. 2007. p143

¹⁹ Scott Mccloud. The Infinite Canvas. February 2009. Web. 7 May 2013 <<http://scottmccloud.com/4-inventions/canvas/index.html>>

Layout of story in a magazine

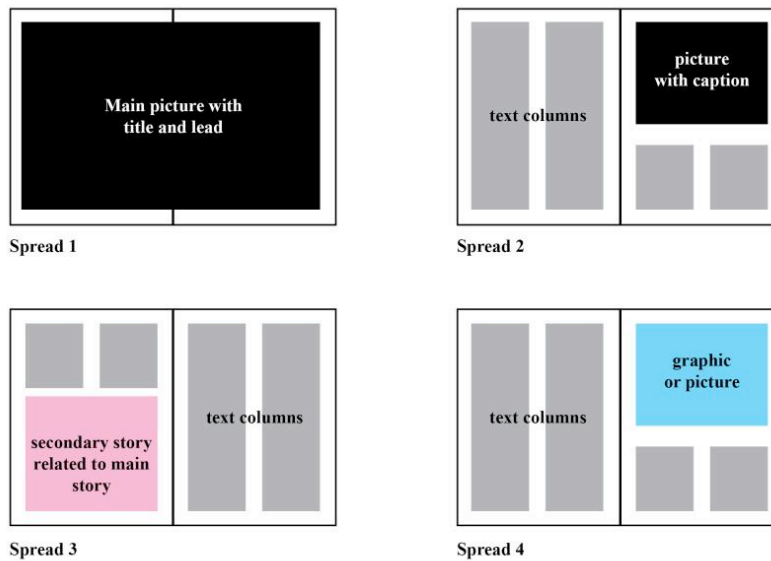


Figure 4

Layout of story in a print magazine, Illustration by Pedro Monteiro. Source: <http://digital-distribution.org/2011/07/03/narratives-for-digital-distribution/>

Working within the physical boundaries of pages, the text is set on columns and flows, from one spread to another without much control of where it breaks from one column to the next or from one page to the next. Pictures of the story, as well as the graphic and secondary story insert, is placed on the spreads to achieve visual enhancement and readers will have to stop reading the main text to absorb additional information. The same dissection patterns emerge when converting the same story to the web—stories are presented using a top picture and a scroll-down text column. If the story has secondary pictures and texts, these items are presented alongside the long column of text or, in the case of secondary pictures, by making the top picture a slideshow. Pedro Monteiro concludes: “Even on publications on the iPad, the same way of presenting a story remains. Most publishers approach tablet publishing using either a print or a web paradigm.”²⁰

²⁰ Pedro Monteiro. Narratives for Digital Distribution. 2011. Web. 7 May 2013 <<http://digital-distribution.org/2011/07/03/narratives-for-digital-distribution/>>

3.3 Table of contents

Table of contents usually includes the titles and descriptions of magazine articles divided by sections if such categorization exist. The depth of detail depends on publishers style and is affected by the total volume of the magazine—more titles implies less detailed descriptions. In the print magazine table of contents indicate page numbers where each part starts. In online publishing environment table of contents is known as sitemap, it is special page intended to act as a website guide. Nielsen recommends sitemaps as they are the only feature that gives users a true overview of everything on a site.²¹ More importantly, sitemaps help users at a critical time when they are lost and might abandon website, if they do not get that piece of assistance to find their way around.

In digital magazine table of contents has a similar purpose—to guide the reader through the issue and give characteristics of articles like description, size and location in the magazine.

Even if the magazine is featuring single story, table of contents or the sitemap equivalent is still important to help user comprehend issue dimensions and locate his position in the magazine. For the online environment, breadcrumbs are used as secondary navigation aid. It is one line of text showing a page's location in the site hierarchy To navigate, site visitors mainly use the primary menus and the search box, which are certainly more important for usability. From time to time people do turn to the site map or the breadcrumbs, particularly when the main navigation does not meet their needs.²² Breadcrumb functionality could be applicable to digital magazine, according to Nielsen, stating that for non-hierarchical sites, breadcrumbs are useful only when it is reasonable to show the current page's relation to more abstract or general concepts.

²¹ Jacob Nielsen. Site Map Usability. September 2, 2008. Web. 7 May 2013 <<http://www.nngroup.com/articles/site-map-usability/>>

²² Jacob Nielsen. Breadcrumb Navigation Increasingly Useful. April 10, 2007. Web. 7 May 2013 <<http://www.nngroup.com/articles/breadcrumb-navigation-useful/>>

3.4 Volume

Although there is no reliable data sources or research done about digital magazine volume, it is assumed that 150-200 page issues are too big for digital consumption. The average time spent per one magazine reading session is 42 minutes in the print version and 32 minutes digital. Attention span online is far less—9 minutes (Figure 5).

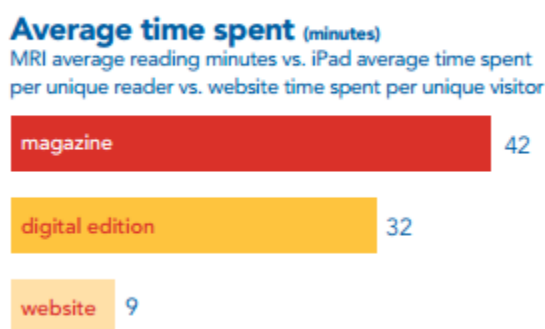


Figure 5

Average time spent on magazine reading. Source: GfK MRI and Omniture/Conde Nast, Spring 2011

4. Production workflow and authoring tools

4.1 Unbundling

Digital content unbundling became widely recognized after Apple launched its online music store letting customers quickly find, purchase and download the song they want for just 99 cents without subscription fees.²³

²³ Apple Launches the iTunes Music Store. Press release. April 28, 2003. Web. 7 May 2013
<<http://www.apple.com/pr/library/2003/04/28Apple-Launches-the-iTunes-Music-Store.html>>

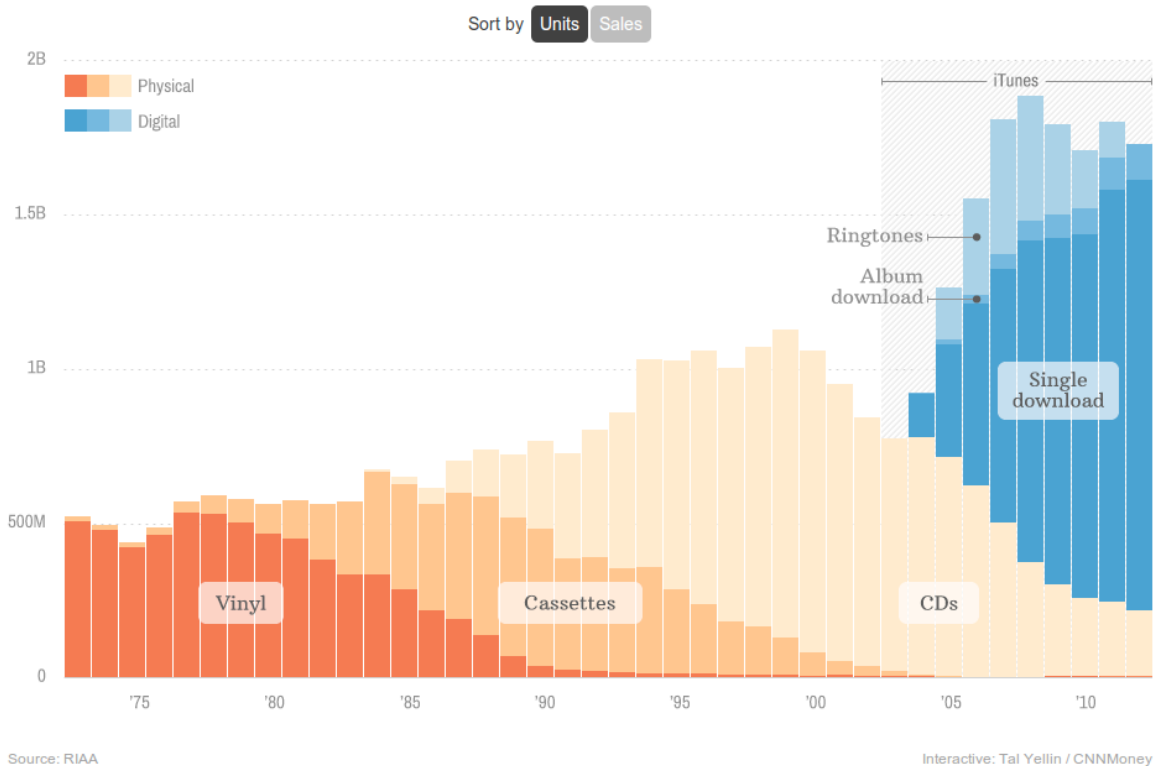


Figure 6

How iTunes crushed music sales. Source: <http://money.cnn.com/interactive/technology/itunes-music-decline/?iid=EL>

Following the example of unbundling music albums Anita Elberse suggests that suppliers of information goods need to rethink the design and and essence of a bundle. In the context of the music industry, this implies that the common practice of bundling, for example, eleven marginally appealing titles with one highly attractive item in the hopes that the latter will drive bundle sales may quickly lose its power. In magazine context, the highly attractive item usually is the cover story, which sparks reader’s interest and results in the purchase of the whole bundle. As the same study concludes, content producers may in the future be better off releasing a bundle with only the eleven less appealing items and selling the highly attractive title separately. Similarly, providers may increasingly want to give preference to quality over quantity, and design smaller bundles if eliminating items means the quality is then more evenly distributed.²⁴ When magazines entered the digital space, they brought their the same album-oriented approach replicating print experience. Publishers call them “issues” or sometimes “editions,” but digital

²⁴ Anita Elberse. Bye Bye Bundles: The Unbundling of Music in Digital Channels. November 1, 2009. Web. 7 May 2013 <http://www.people.hbs.edu/aelberse/papers/Elberse_2010.pdf>

readers have called them loosely associated bundles of content, only a fraction of which they will actually read.²⁵

Hamish McKenzie also supports the statement that packaged content in digital no longer makes sense. “We humans still love to read – and since getting a Kindle, and then an iPhone, and then an iPad, I now read more magazine journalism than ever – but we want to do it on our terms. We will always need editors to commission and shape strong stories, but we do not need them so much to bundle disparate pieces of content into one immutable chunk.”²⁶

Apart from media consumption magazine always provided content discovery function built upon the trust and recognition of established editorial teams. Although readers do enjoy the serendipity of the way magazines are put together, it is not factor of crucial importance when it comes to digital publications. As Anthony Kosner points out: “People have been trained by Google to expect to get the best version of what they are looking for, quickly.”²⁷

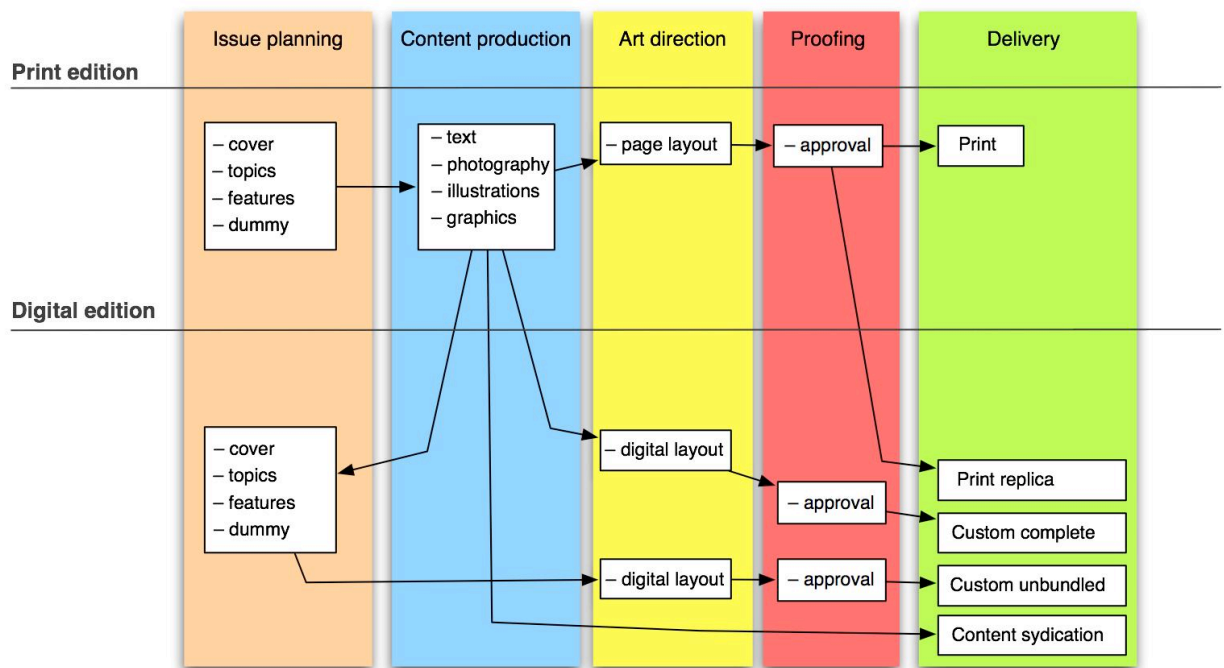
4.2 Publishing workflow

Typical production workflow of magazine consists on of five stages—planning, commissioning content, editing, art direction and delivery. Managers and editors get together and plan what the main topic and features and then make assignments. A page planning can also be used in this step creating preliminary layout that shows reserved space for advertising or editorial content. Content commissioning phase is following the design and art direction procedure, which is carried out for each distribution channel separately, excluding print replica edition which does not require additional efforts.

²⁵ Antony Wing Kosner. Steve Jobs' Ghost: Hi-Res iPad Will Undermine the Magazine Model. Forbes. March 12, 2012. Web. 7 May 2013 <<http://www.forbes.com/sites/anthonykosner/2012/03/12/steve-jobs-ghost-hi-res-ipad-will-undermine-the-magazine-model/>>

²⁶ Hamish Mckenzie. Magazines Don't Have a Digital Problem, They Have a Bundling Problem. August 13, 2012. Web. 7 May 2013 <<http://pandodaily.com/2012/08/13/magazines-dont-have-a-digital-problem-they-have-a-bundling-problem/>>

²⁷ Antony Wing Kosner. Steve Jobs' Ghost: Hi-Res iPad Will Undermine the Magazine Model. Forbes. March 12, 2012. Web. 7 May 2013 <<http://www.forbes.com/sites/anthonykosner/2012/03/12/steve-jobs-ghost-hi-res-ipad-will-undermine-the-magazine-model/2/>>



Digital publication

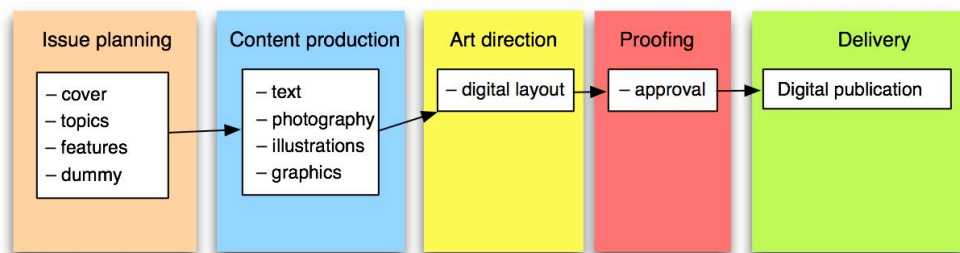


Figure 7

Comparison of multi channel and digital-only publishing workflows

Different production procedure is set for digital editions as seen on Figure 7. Unbundling approach is beneficial for publishers starting out digital-only magazines as they are not subject to legacy system and print production workflow. Considering there is no more prerequisite to meet requirements of both—print and digital publishing environments, digital-only workflow has advantages in all stages—it eases content commissions, authoring and approval procedures.

4.2 Authoring tools

Choice of authoring tools does not affect magazine volume or publishing frequency, but it has a serious impact on layout, aesthetics and design consistency. Depending on technology origin two main approaches evolve:

4.2.1 Print production

Magazine production environment is largely associated with Adobe software, which still dominates the market since desktop publishing revolution in 1985 radically changed the publishing process.²⁸ This change was the result of two things, each a combination of recently developed hardware and software:

1. Page layout software running on a personal computer (Aldus PageMaker and Apple Macintosh);
2. Apple Laserwriter printer with high-function page description software (PostScript).

Adobe InDesign is still considered an industry standard for magazine design. Designers have become familiar with page based layout and it gives Adobe advantage when integrating print design toolset with its own digital publishing solution—Digital Publishing Suite, tailored for tablet publishing. Meanwhile, print publishing software brings significant drawbacks for magazine format – large file sizes and text search limitations - features crucially important for digital publishing. Some publishers have established their own subsidiaries – for example, digital publishing platform Mag Plus, owned by Bonnier Group, claims they serve more than 1000 magazine applications.²⁹ Still Adobe DPS remain primary choice for magazine publishers like Time Inc., Meredith, Hearst, Condé Nast and Reader’s Digest.³⁰

²⁸ Bevi Chagnon. The Publishing Business: Desktop Publishing Software. August 2002. Web. 7 May 2013 <<http://quod.lib.umich.edu/cgi/t/text/text-idx?c=jep;view=text;rgn=main;idno=3336451.0008.107>>

²⁹ Magplus.com Clients. Web. 7 May 2013 <<http://www.magplus.com/clients/>>

³⁰ Adobe Digital Publishing Suite Team. Time Inc. Joins Top 5 Publishers on Adobe DPS. December 6, 2012. Web. 7 May 2013 <<http://blogs.adobe.com/digitalpublishing/2012/12/time-inc-joins-top-5-publishers-on-adobe-dpsthelargest-consumer-magazine-publishers-in-the-world-are-powered-by-adobe-digital-publishing-suite.html>>

4.2.2 Online publishing origins

Digital magazine publishing is also approached using non proprietary web development standards. Together with fast growing digital book market, web technology based on html, css and javascript has advanced to the level where it can reach print quality standards, yet being achieved with desktop publishing software.³¹

As a matter of course web technology based magazines more resemble web browsing experience ruling out page as essential layout entity. Instead widely adopted web features are used including scrollable interface, interlinking and content units with flexible dimensions flowing out of pixel-perfect layout margins. The most prominent example is the Financial Times web application which is now drawing more traffic than the native application.³²

Each approach has its advantages and drawbacks influencing magazine format. Native applications have good integration with print production software providing feature rich design opportunities and advantage of connected marketplace. Significant drawbacks are limited potential of content discovery through other platforms including open web environments and platform costs. Web applications provide multiplatform accessibility, allows unrestricted content distribution but lacks approved marketplace and holds certain limitations regarding performance of design toolset (Figure 8).

³¹ Joshua Gross From Print to Web: Creating Print-Quality Typography in the Browser. October 24, 2011. Web. 7 May 2013 <<http://www.onextrapixel.com/2011/10/24/from-print-to-web-creating-print-quality-typography-in-the-browser/>>

³² Jennifer Saba. FT Web-based app more popular than app sold in Apple store. Reuters. September 22, 2011. Web. 7 May 2013 <<http://www.reuters.com/article/2011/09/22/us-ft-idUSTRE78L49Q20110922>>

	Advantages	Drawbacks
Native apps (iOS, Android)	<ul style="list-style-type: none"> Feature rich Powerful Secure Offline reading capability Quick publishing E-commerce ready Ecosystem (userbase) 	<ul style="list-style-type: none"> Complex Uniplatform Expensive Ecosystem (closed) Customer data accessibility
html5 apps (web apps)	<ul style="list-style-type: none"> Simple Multiplatform Low cost No approval process E-commerce No ecosystem (open to distribution) 	<ul style="list-style-type: none"> Under development Format, layout, design Limited offline capability No ecosystem (userbase)

Figure 1

Comparison of native and web application development platforms

5. Methods

To investigate digital layout efficiency, multiple methods are chosen—heuristic evaluation, user observation and questionnaire. Heuristic analysis and observation are used for qualitative measures while evaluation questionnaire serves for quantitative research.

5.1 Heuristic analysis

Heuristic analysis is a cheap, and easy evaluation of a user interface design. Heuristic evaluation is the most popular amongst usability inspection methods. It is done by systematic inspection of

a user interface design. The goal of heuristic evaluation is to find the usability problems in the design so that they can be attended to as part of an iterative design process. The most used set of heuristics was developed by Nielsen & Molich in 1990.³³ The set contains ten guidelines to be fulfilled by a usable user-interface, presented in the following list:

1. Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

2. Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

5. Error prevention

Even better than good error messages is a careful design, which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

6. Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable

³³ J. Nielsen and R. L. Mack. Usability inspection methods. 1994.

whenever appropriate.

7. Flexibility and efficiency of use

Accelerators unseen by the novice user may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

8. Aesthetic and minimalist design

Dialogues should not contain information, which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Heuristic analysis is known to be a solid method to reveal major usability flaws. Evaluation should be done by a specialist who has usability background or knowledge about the platform and particular user interface. Although experts are more capable at user interface investigation, even novice evaluators are able to notice a majority of usability problems.³⁴

The main drawback of this method it does not involve real users. To get more coherent results, heuristic evaluation is integrated with other methods employed in this study. The set of heuristics is also adopted to create codes and structure the data extracted from user observation sessions. To support heuristic evaluation state transition diagrams were created—visualized interaction chain of events presented through a sequence of digital magazine screens (Figures 9 and 10).

³⁴ Jacob Nielsen. Finding Usability Problems Through Heuristic Evaluation CHI'92. May 3-7, 1992. Web. 7 May 2013 <<http://www.itu.dk/people/hulda/Usability/artikler/p373-nielsen.pdf>>

5.2 Direct observation

To achieve highest possible research validity Hofstede suggests using at least two measurement approaches and look for convergence between them.³⁵ So a method that examines verbal behavior such as interviews and questionnaires supports direct observation method that focuses on actual user behavior.

Observation method was chosen to distinguish what people do and what they think they do. While “responding to questionnaires or interviews is also a form of behavior, we should distinguish “words” (questionnaires, interviews) from “deeds” (nonverbal behavior). Values should never be equated with deeds, for the simple reason that behavior depends both on the person and the situation. However, values as the desired are at least closer to deeds than values as the desirable.”

Direct observation is supported with think aloud method. Think aloud test is a method when test participants are asked to use the system while continuously thinking out loud—that is, simply verbalizing their thoughts as they move through the user interface.³⁶ This method has a lot of advantages. Most important, it gives immediate response on current actions discovering what users think about user interface. It is possible to determine misconceptions, which usually is turned into redesign recommendations. The method is suitable to learn why users guess wrong about some parts of the user interface and why they find others easy to use.

During a think aloud session, a participant is instructed to use an interface while continuously thinking out loud. This is done while executing predefined tasks. User comments are recorded and transcribed or they are observed live and noted down. Think aloud produces a great deal of qualitative data from a small amount of users.

³⁵ Geert Hofstede. Culture's consequences: International differences in work-related values. 1984. p17-21

³⁶ Jakob Nielsen. Thinking Aloud: The #1 Usability Tool. January 16, 2012. Web. 7 May, 2013
<<http://www.nngroup.com/articles/thinking-aloud-the-1-usability-tool/>>

6. Test setup

6.1 Test material

6.1.1 National Geographic magazine

National Geographic magazine is the digital version of its printed counterpart available through Apple Newsstand application. Magazine content is enriched with interactive features to power stories with multimedia, slideshows and video elements. For the first half of 2012 National Geographic claims to have 2.9 million app downloads³⁷ and 134,656 subscriptions³⁸

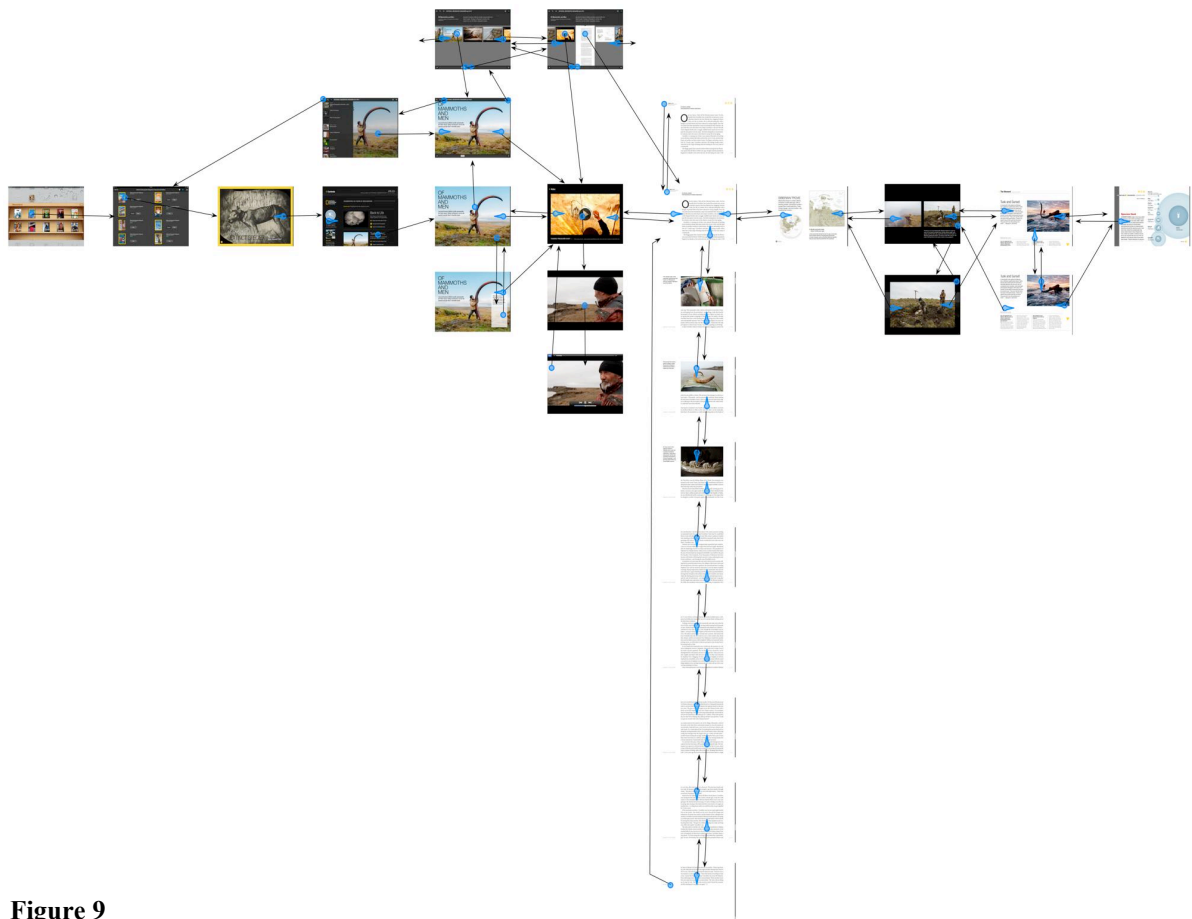


Figure 9

National Geographic. State transition diagram

³⁷ National Geographic Shows 30.9 Million Worldwide Audience via Consolidated Media Report. Press release. September 24, 2012. Web. January 30, 2013 <<http://press.nationalgeographic.com/2012/09/24/national-geographic-shows-30-9-million-worldwide-audience-via-consolidated-media-report/>>

³⁸ Alliance for Audited Media. Top 25 U.S. Consumer Magazines for June 2012. Web. January 13, 2013 <<http://www.auditedmedia.com/news/research-and-data/top-25-us-consumer-magazines-for-june-2012.aspx>>

Format characteristics

Sample issue has 138 pages in total containing 5 long form articles ranging from 7 to 14 pages each, counting total 56 pages. The page is either single page or single page with additional features user can initiate without leaving the current page to another screen. Almost all pages are supplemented with colourful images—photos and illustrations. There are 31 full page photos, 4 pages with photo pairs—page with 2 pictures in the page allowing the user to zoom each photo to full page aspect. The magazine also features 3 slideshows (with 18 photos in total) and 6 videos, two of them presented in full screen by default.

42 pages in the magazine are annotations, editor columns, user generated content, interactive games, such as a puzzle or short essays visually represented as a combination of text and illustrations.

Navigation through articles is organized horizontally, and article pages are arranged on the vertical axis. Some of the multimedia features appears as an additional layer of information on the top of the current page in the form of text or illustration. Magazine has only horizontal orientation without possibility to view the content when holding device in a vertical position.

6.1.2 TRVL

TRVL started out as iPad exclusive digital magazine in 2010 short after first iPad was launched. The magazine founders Michel Elings and Jochem Wijnands had no previous magazine publishing experience. The first issue contained 5 articles and was sold for \$1.99 through Apple Appstore.

Although magazine had thousands of app downloads, paid subscriptions counted for trivial amounts. After publishers had switched to free subscriptions by publishing one story at a time, magazine saw exponential audience growth.³⁹

In April 2013, TRVL published its 100th edition, announcing 1 million app installs. TRVL has a five-star rating and readers in 193 countries.⁴⁰

³⁹ These Guys Kick Apps presentation. July 26, 2011. Web. 18 April, 2013 <<http://vimeo.com/32189554>>

⁴⁰ TRVL celebrates 1,000,000 app installs and 100 magazines. Press release. April 11, 2013. Web. 7 May, 2013 <<http://trvl.pressdoc.com/43148-trvl-celebrates-1-000-000-app-installs-and-100-magazines>>

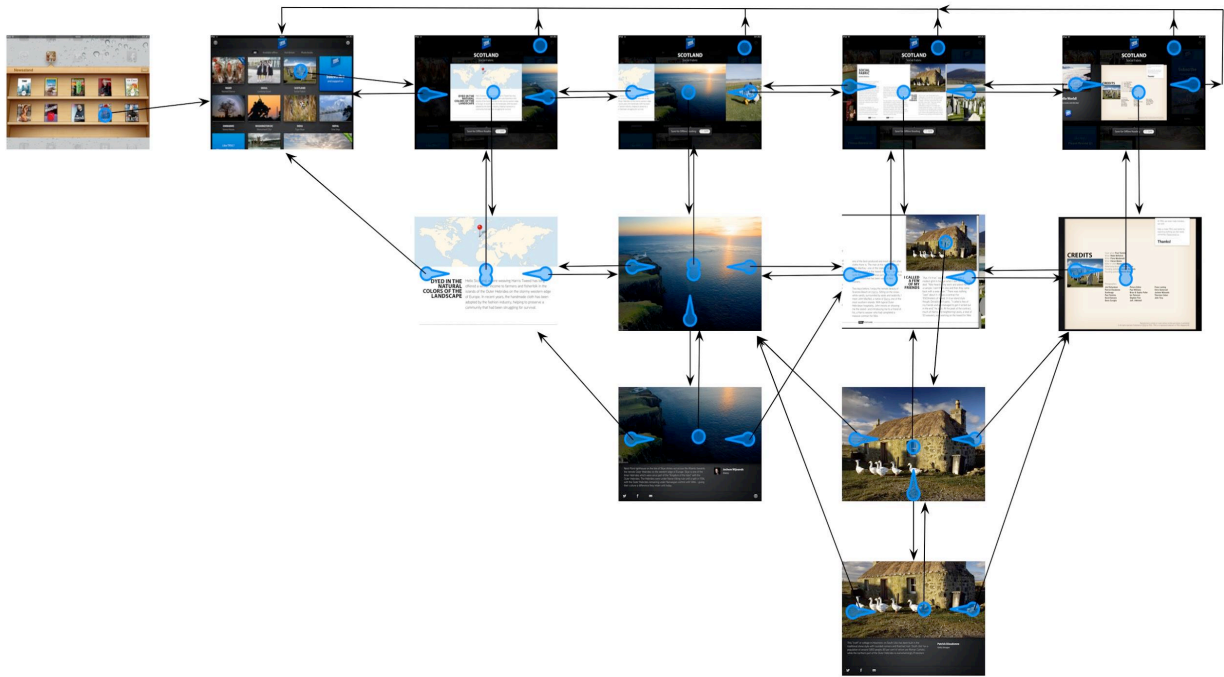


Figure 10

TRVL magazine. State transition diagram

Format characteristics

TRVL is iPad exclusive digital magazine distributing its content using native iOS application. Magazine has page based layout featuring single story that contains photos, text and embedded videos from online video services—Vimeo.

Magazine has 49 pages in total, containing 35 photos (26 in landscape format and 9 in portrait), 5 embedded videos from Vimeo and 15 pages containing text. Each photo has a caption with a short description of picture taken along with technical data and credits. Next to caption, social network icons are provided to allow users share the page. Corresponding screen captures then is shared together with application download link in Appstore

Navigation is linear, organized from left to right. Vertical navigation is used only to read photo captions (swipe up), or as the shortcut to fast page flipping mode (swipe down). Swipe in the opposite direction returns user to the previous position in the magazine.

Magazine has landscape and portrait viewing options. Total amount of content in the page stays the same in both versions by resizing the pictures accordingly to page margins.

Each magazine features single story and table of contents is not presented. Application also lacks user instruction and help sections.

Main content format characteristics are compared in Figure 11.

	National Geographic	TRVL
Page count (total)	138	49
Articles, long form	5	1
Article volume, long form (words)	2647 (average)	3461
Photos (full page)	39	35
Video	6	5
Bonus content pages (short essays, annotations, interactive games)	42	0
Table of contents	3 types of menus	0
Orientation	Landscape	Landscape/Portrait

Figure 2

Content Unit comparison. National Geographic and TRVL magazine

6.2 Test device

iPad 2nd generation



Figure 12

Test device. iPad 2. Source: <http://www.apple.com/ipad/ipad-2/specs.html>

Size	Height: Width: Depth: Weight:	24.1 cm 18.6 cm 0.9 cm 601 g
Display	Size: Resolution: Features:	9.7 inches = 24.6 cm (diagonal) 1024x768 (132 pixels per inch) LED-backlit, multi-touch, widescreen
Connections	Wi-Fi Bluetooth 3G	Only in Wi-Fi + 3G model
Cameras	Back camera:	HD (720p) 30 fps video recording 5digital zoom still camera
	Front camera:	VGA video recording VGA still camera
Other	Storage: Battery life:	16/32/64 gigabytes 10 hours

Figure 3

Test device specifications Source: <http://www.apple.com/ipad/ipad-2/specs.html>

6.3 Environment

Tests are conducted in environments where tablets are naturally used. According to the research done by Online Publishers Association 67% of users use tablets at home, 15%—at work or school, 14% in the car or while commuting, and the rest—while shopping (4%).⁴¹ Another study which examines timing, found that the most of reading is done in the evenings after work – the same time (8 – 10 PM) appear on all graphs.⁴²

Test participants were visited in their homes allowing them to sit on the couch in lean back position to experience relaxed and comfortable reading. Figure 14 shows typical experiment environment. One of the tests was conducted in the lobby of a public institution insuring distraction free reading environment.

⁴¹ Online Publishers association. June 2012. Web. 7 May, 2013 <http://onlinepubs.ehclients.com/images/pdf/MMF-OPA -- Portrait of Tablet User-Wave 2 -- Jun12_%28Public%29.pdf>

⁴² Pocket. Is Mobile Affecting When We Read? January 12th, 2011. Web. 7 May, 2013 <<http://getpocket.com/blog/2011/01/is-mobile-affecting-when-we-read/>>

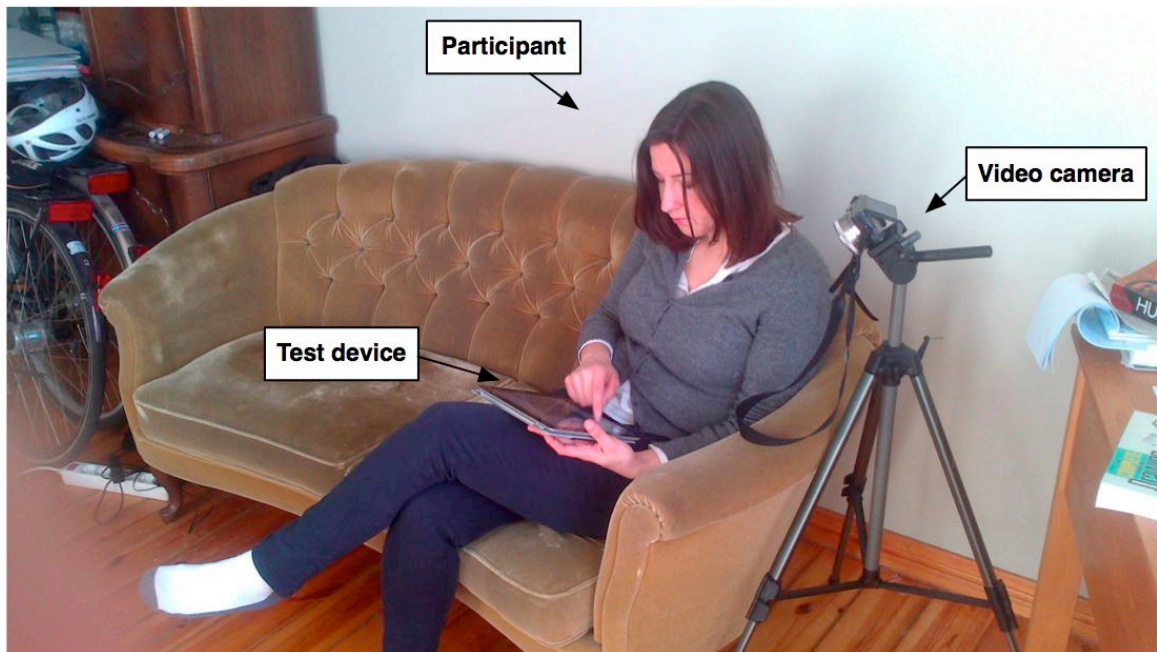


Figure 14

Test environment

All sessions were recorded with fixed digital camera adjusted to observe user actions on the screen. Screencasting software would be useful for test documentation, but appropriate solution that could capture gestures performed by the user was not found in the market.

6.4 Test participants

Test subjects were recruited using social network connections. Participants were selected randomly with no prerequisites other than experience using smartphone and fluent English language. Prior to tests, all were asked to fill basic preliminary questionnaire by answering simple questions about their experience using tablet computers.

Considering that tablet computer penetration and usage is still in early adopter stage, high proficiency was not expected. In Latvia where test was conducted, according to the study ordered by mobile service operator LMT 10% of the total population have experience using tablet devices.⁴³

⁴³ LMT: Planšetdatorus lieto jau katrs desmitais valsts iedzīvotājs. Press release. November 1, 2012. Web. 2 February, 2013 < <http://www.lmt.lv/lv/preses-relizes?g=2012&pid=297>>

Amongst all participants, 2/3 were regular tablet users and one third had a little previous experience and all of them had smartphone as mobile communication device. Other demographic characteristics include age – it is in the range between 27 and 41 year with mean average 33. Gender distribution is almost equal—55% males and 45% female representatives.

6.5 Test scenario

Every test was conducted by the following scenario:

1. Before iPad was given to participant, device was wiped clean, and all magazines available for the test were set to home position. Articles were set to start position eliminating the possibility for the user to revert to last reading state of the previous session.
2. A short overview of the test was given to allow proper orientation.
3. User did 10 tasks, answering the satisfaction questionnaire after every task. 5 tasks were performed on each magazine.
4. Free reading task was presented during which participant had 10 minutes to spend reading each magazine.
5. After free reading task user was asked to fill evaluation questionnaire based on recent experience.

6.6 Tasks

6.6.1 Efficiency tasks

1. User is asked to browse the content and find full page photo he likes the most. After favorite picture is chosen, user is asked to return to the first page.

2. User is asked again to find the picture he liked in the first task. Then he is asked to get and read photography captions
3. User is asked to explore videos and mark down one he might want to watch later. After the video is found, user is asked to return to the magazine shelf.
4. User is asked to flip through the content and find the article or topic he might be interested. User asked to share either image or article using email.
5. Find magazine credits. User is asked to find editorial "about us" page.

6.6.2 Free reading task

Participant had given 10 minutes to spend reading each magazine. Magazines are presented in mixed order—for half of participants the first title is TRVL, for other—National Geographic. The task is intentionally created without any guidance to allow participant freely enjoy the contents of each magazine by selecting topics of own interest.

7. Analysis

As a result of the user tests explained in the previous chapter, significant amounts of data was acquired. Each participant answered 16 questions regarding recent reading experience and 12 questions about digital magazines in particular. In total, 252 questions were answered, and 18 free reading sessions were recorded. This chapter explains the ways the data was analyzed to obtain the results

7.1 Qualitative analysis

Considering the test samples were different not only in terms of format, but also had diverse content and volume they were treated accordingly and analyzed individually.

All recorded video files from the test sessions were transcribed and then analyzed using predefined code system. Codes were attributed to key patterns indicating usability problems. Code system was adapted from Nielsen's usability scale, and all data were then arranged in the order from higher error score to the lowest. For example, when participant said, "I do not quite understand where am I" the behaviour was coded as a system feedback problem and categorized under "visibility of system status". The same approach was used to transcribe and code data from user observation. If user intended to return to the beginning of the magazine but instead was redirected to the magazine home page, the error was marked as misleading icon design and filed under "Consistency and standards".

7.2 Quantitative analysis

All data gathered from evaluation questionnaires were calculated in Microsoft Excel spreadsheet by extracting mean values from Likert scale. The input data for calculations were acquired as follows: when user marked answer "Strongly agree" it was recorded as "4", "Strongly disagree" opinions were set as "0", and relevant values were attached to responses "Agree", "Undecided" and "Disagree". The same way answers about digital magazine features were analyzed.

Remaining datasets containing information about user preferences regarding digital magazine formats, reading time per session and per article were summed up and presented in percentage scale.

8. Results and discussion

8.1 Time distribution by activity

Time devoted to each activity were summed up based on user choices during free reading task. Time distribution spent on activities for each magazine is plotted in Figure 15, showing that engagement with video content is doubled in TRVL magazine case and actual time spent reading is by 70% more than in National Geographic reading sessions.

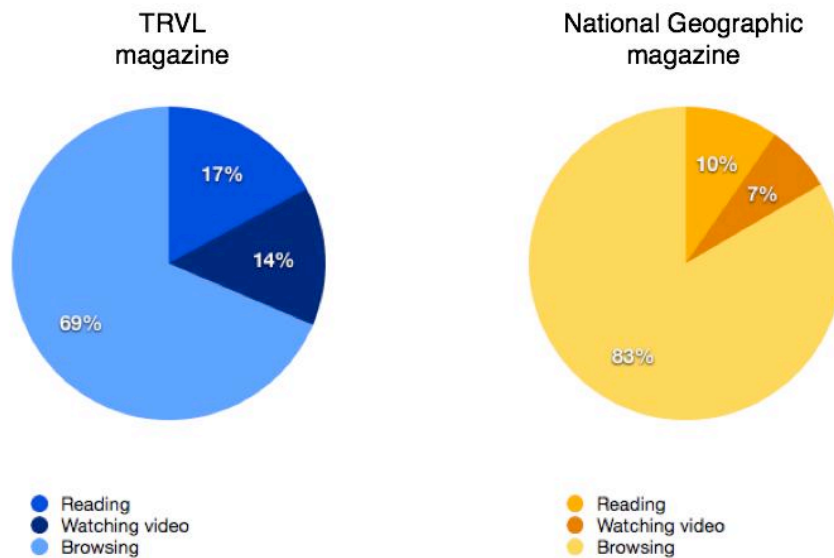


Figure 15

Time distribution by activity

8.2 Usability and engagement

8.2.1 Efficiency

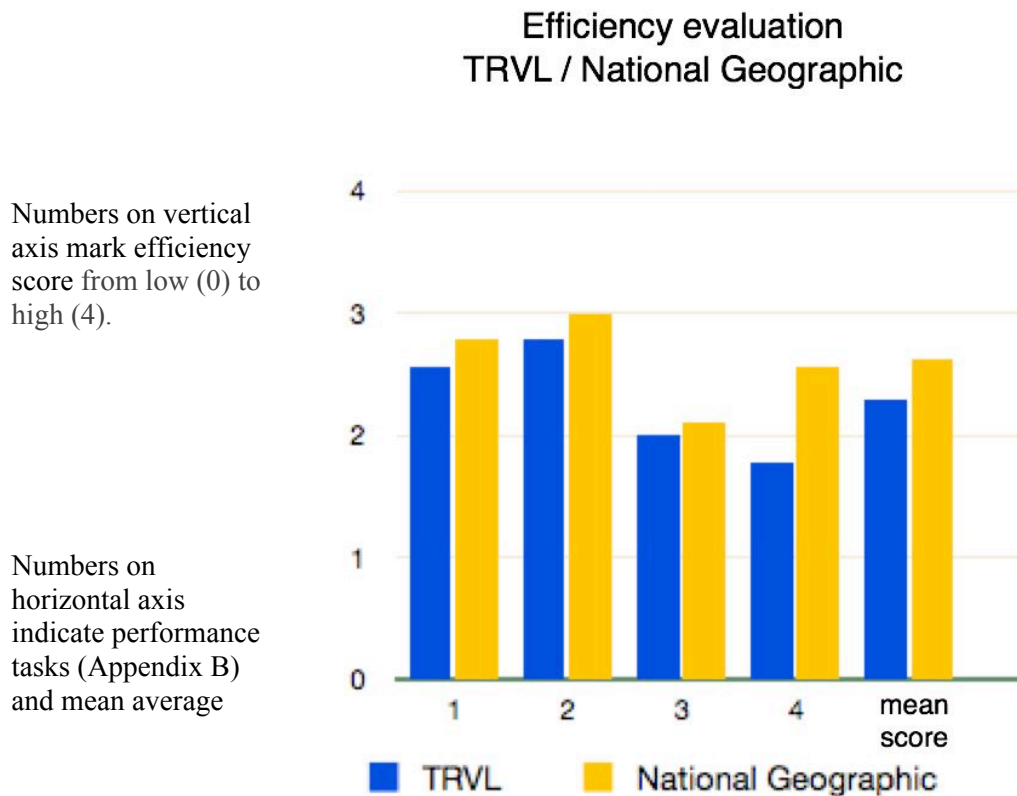


Figure 16

Efficiency evaluation TRVL magazine and National geographic

Results in the Figure 16 show user evaluation of digital magazine efficiency. Numbers 1 – 4 on the horizontal axis implies different questions concerning goal oriented action performance. The lowest score (question nr. 3, “I could explore easily many topics without getting lost”) for both magazines confirms the pattern that readers seamlessly are getting lost in magazine navigation structures. Overall score shows slightly better results for National Geographic.

8.2.2 Engagement

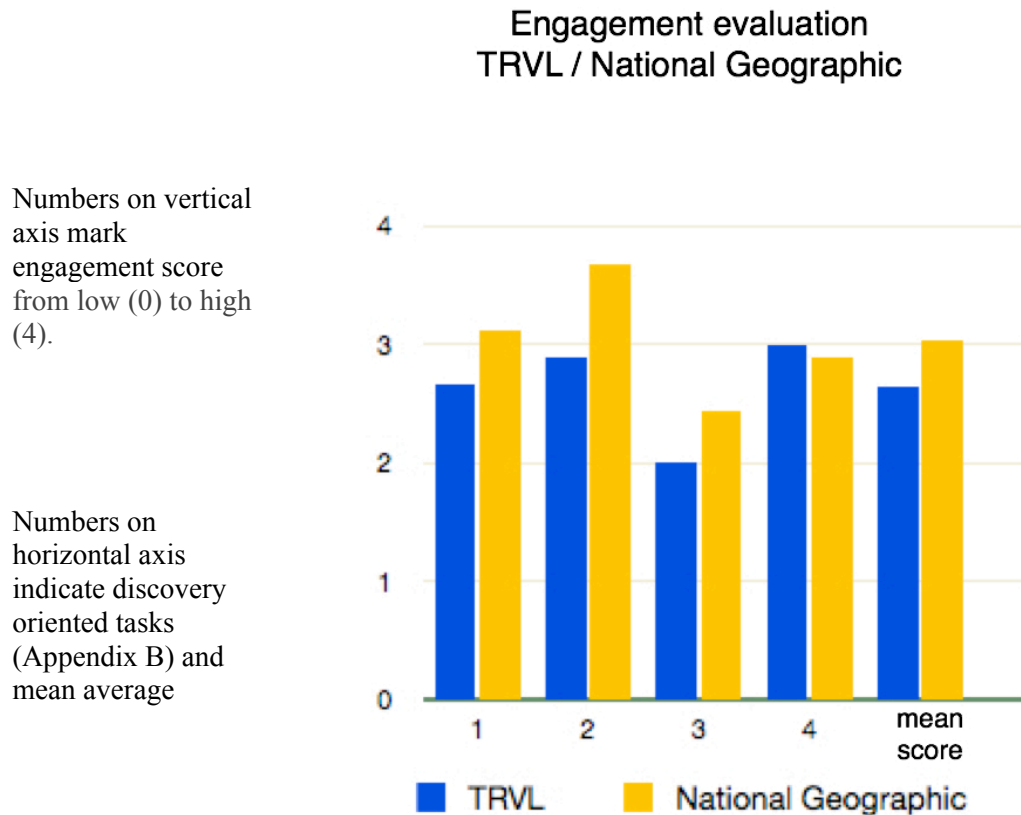


Figure 17

Engagement evaluation TRVL magazine and National geographic

Engagement scores in Figure 17 show how test participants perceived usability from content discovery perspective. Four questions included various aspects of serendipity allowing users to evaluate their experience on finding content unintentionally. Also in this category results are more favorable for National Geographic with the exception in answers to the fourth question “The magazine encouraged me to browse and explore” where TRVL is few units ahead.

8.2.3 Qualitative measures

Although results from evaluation questionnaires does not show remarkable difference comparing efficiency and engagement scores, qualitative analysis reveal distinct user behaviour. As described in Chapter 5, “positivistic fallacy” is observed leading to distinction between reality (observation) and desirability (evaluation).

The following paragraph is stating essential usability issues found by analyzing user behaviour in each magazine separately.

National Geographic

Figure 18 shows total error count fixed while they were performing tasks summed up with misconceptions in free reading session.

Major confusion users experienced by trying to assess the whole magazine layout and structure. It was hard to find and understand menu (6 times), with the intention to explore table of contents users were thrown out of the magazine to magazine shelf (9 times). Inability to see the current position in the magazine (5 times) also refers to layout transparency problem.

Second substantial aspect relates to navigation and article structure. Users complained about inconsequential vertical/horizontal navigation path (6 times) and unclear boundaries between the articles (3 times).

Less severe mistakes were made caused by content design. Users confused swiping inside the content with swipe to the next page (10 times) and tried to click to design elements resembling links to further content (5 times).

	Occurrence	Usability issue	Category	Total
1.	User cannot to flip to the next page	Swiping in pages that contain additional swipe areas, image galleries or additional layers explaining the content are confused with the intended swipe to the next page	Error prevention	10
2.	User unexpectedly exits the magazine.	Home icon in right upper corner redirects the user to the shelf with all issues, and not to the home screen/ table of contents of the issue as it might be expected	Consistency/standards	9
3.	User cannot find menu/navigation bar	No indication how to invoke the menu while navigating through the magazine pages	Recognition/recall	6
4.	User is confused about navigation path	No clue how to read the story as the magazine has both horizontal and vertical browsing directions.	Consistency/standards	6
5.	User is disoriented	System does not show user's actual position in the magazine.	Visibility of system status	5
6.	User tries to click on design elements inside the content	Several magazine design elements (arrows, headings) appear as buttons	Error prevention	5
7.	User unexpectedly jumps to the next story	No clear article structure is defined	System/real world	3
8.	Video on the cover confuses user	As video on the cover is set to play automatically, user is losing control over application/device	User control/freedom	3
9.	User is forced to move to the beginning of article	User is returned to previous browsing position when selecting an article and not to the beginning	Consistency/standards	3
10.	User encounters empty pages	Some of the features require internet connection	Consistency/standards	3
11.	User tries to get help	User instructions section does not help the user to get a better understanding of the system	Help and documentation	2
12.	User unsuccessfully attempt to tap menu items	Menu buttons are too small and requires very precise tapping	Error prevention	2
13.	User gets a misleading direction	Back button in the menu is confused taking it for 'level up' button	Consistency and standards	1
14.	User loses his reading spot	Content does not scroll, article page jumps to the next by releasing the finger	User control and freedom	1

Figure 18

Overview of errors. National Geographic

TRVL

Total number of usability issues (Figure 19) marked down in TRVL magazine reading sessions were almost 2 times less than users experienced while exploring National Geographic (30 versus 59). However, layout consistency problems dominated also in this case. Magazine lacks table of contents and users struggled to find guidelines explaining magazine structure (9 times). As in National Geographic case, users were disoriented trying to find their actual position in the magazine (5 times). Also, it was hard to realize how to read picture captions, the path was not evident (4 times). Minor issues include misleading tapping (6 times) redirecting the user to magazine shelf and jerky initial content downloads during fast flipping (4 times).

	Occurrence	Usability issue	Category	Total
1.	User cannot find table of contents	Article structure is not evident, total amount of content is not comprehensible.	User control and freedom	9
2.	User unexpectedly exits the magazine.	Accidental tapping outside magazine page redirects to magazine shelf.	Error prevention	6
3.	User is disoriented	System does not show user's actual position in the magazine. Pages lack numbering.	Visibility of system status	5
4.	User cannot read picture captions	There's no evidence that photos contains captions when picture by default is presented in full page mode.	Recognition / recall	4
5.	User encounters empty pages	As content is being downloaded simultaneously with reading, pages does not appear during fast browsing	Consistency /standards	4
7.	User loses his reading spot	Content does not scroll; article jumps to the next. Content is not organically split into pages	Consistency /standards	1
6.	User is confused with magazine selection	Magazine shelf are randomly organized, lacks categorization by issue number, release date.	Consistency /standards	1

Figure 19

Overview of errors. TRVL magazine

Overall two different types of users are recognized—participants of the first group were identified as users with strong web usage habits with corresponding expectations of digital magazine act as a webpage. In the second group were users who treated digital magazine as its print counterpart. The following patterns are observed:

1. Web readers:

- Interpret the text as hypertext and eager to click on the links
- Look for the 'back' button
- Prefer scrolling over pagination

2. Magazine readers:

- Explore magazine mainly through the table of contents
- Expect linear navigation structure
- Prefer pagination over scrolling

8.3 Digital article volume

Majority of respondents thought that optimal digital article length should vary from 4 to 7 pages including all visual materials—illustrations and photos (Table 21). At the same time, respondents were not certain about digital article volume in terms of containing text amount – 90% of votes splitted equally by saying that most appropriate length is either one or 2-3 pages (Table 20).

Average calculated length results in 5.5 page article containing 2.16 pages of text and 3.34 pages of the visual content. Consistence of illustrations and photography then count up to 61% of layout space and 39% is left for textual content.

8.4 Digital magazine volume

Respondent answers regarding total volume of the magazine (Figure 22) were more diverse than estimating article length—majority voted digital issue to be 16 - 30 pages. According to the results, preferred content amount is significantly less than the total volume of digital magazines explored during the tests—National Geographic magazine were 138 pages total and TRVL magazine contained 49 pages.



Figure 20
Digital article volume without illustrations

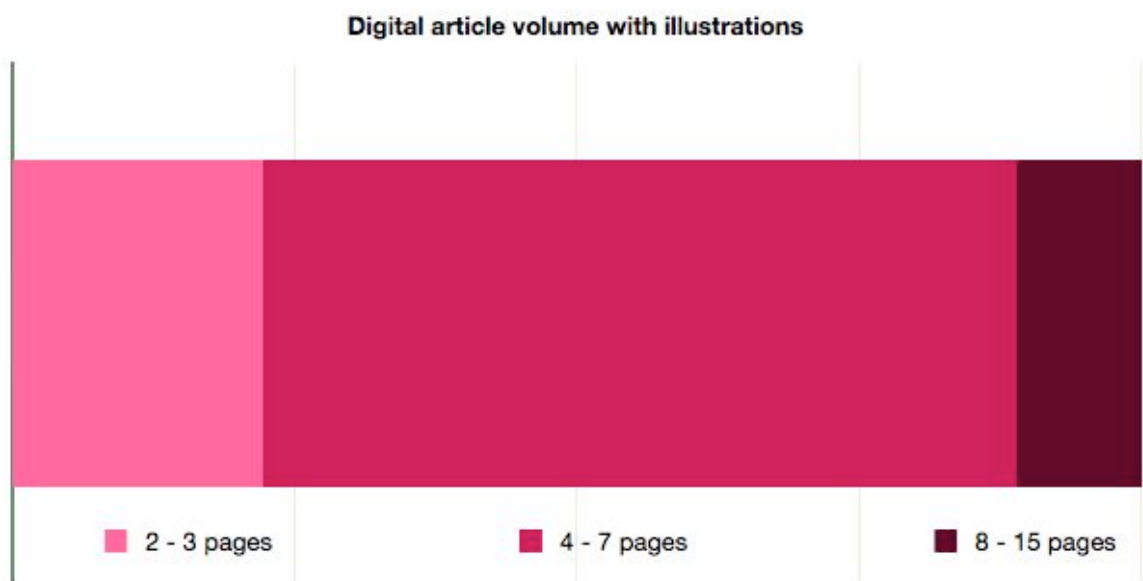


Figure 21
Digital article volume with illustrations

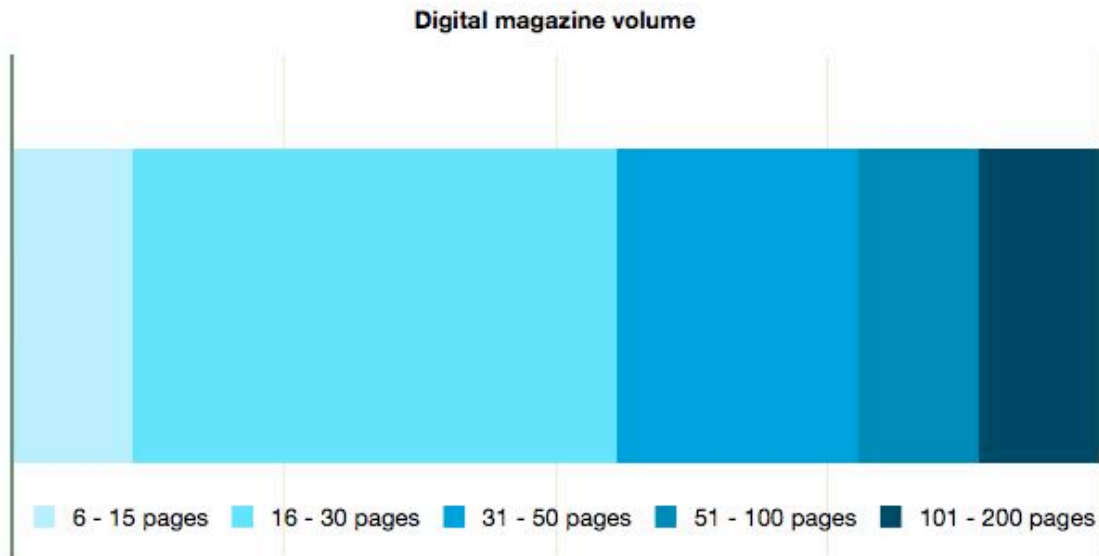


Figure 22

Total digital magazine volume

8.5 Reading time

Figure 23 shows estimated reading time per digital magazine article which is evenly distributed. Less than half (42% of respondents) told, on average, they would like an article to be readable within 4 – 7 minutes. For 35%, it would take 2 – 3 minutes, but 23% have chosen long-form reading: 8 to 15 minutes. Regarding one magazine reading session (Figure 24) majority of test participants thought appropriate timing would be 16 – 30 minutes.

Calculations reveal that on the average reader would spend 5.83 minutes reading an article and 15.28 minutes per one magazine reading session.

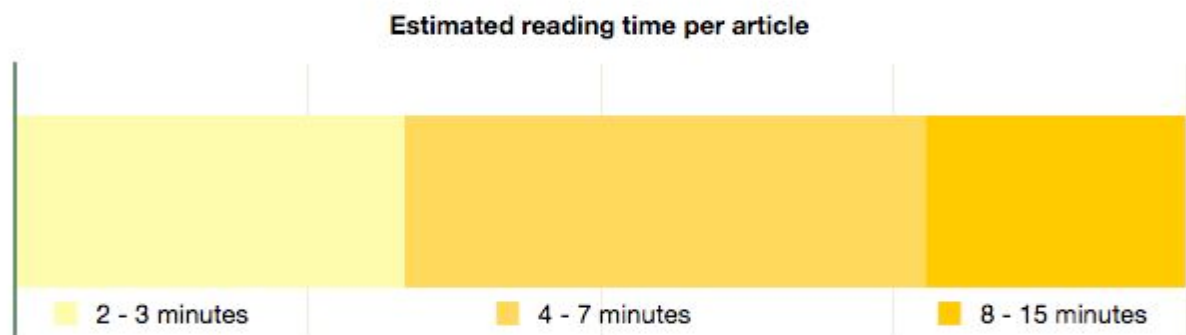


Figure 23

Estimated reading time per article

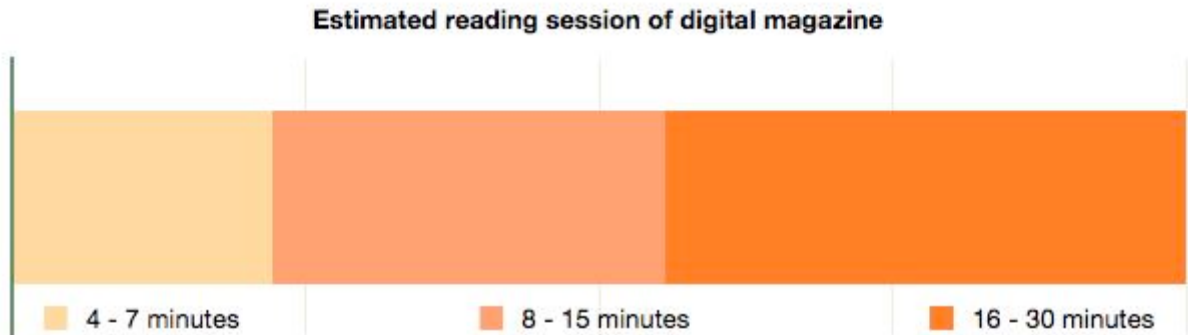


Figure 24

Estimated reading session of magazine

8.6 Publishing frequency

Results about publishing frequency are very conflicting (Figure 25). Although most respondents (42%) chose to receive magazine issues on a weekly basis, 23% would prefer new editions two times per week. On the other end, 35% liked monthly magazines—conventional lifecycle of the print magazine.

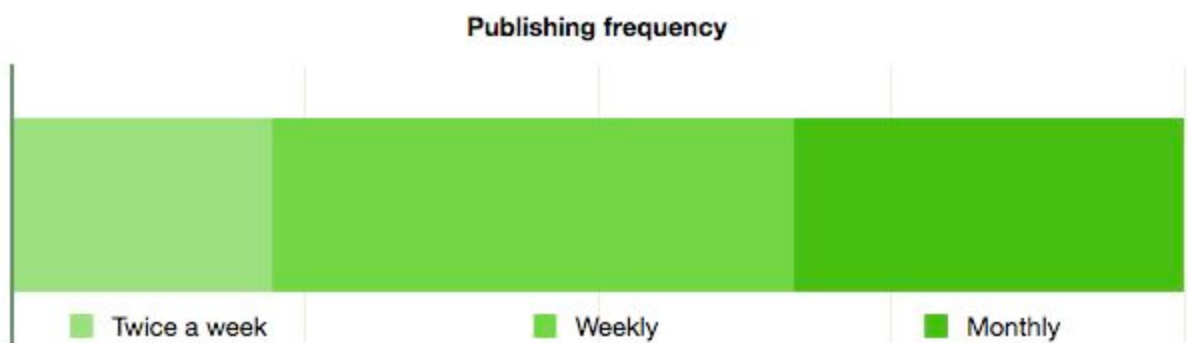


Figure 25

Publishing frequency

8.7 Features

Figure 26 summarizes the importance of specific features, available on digital magazine editions. It is notable that readers value bookmarking feature allowing read their favorite articles later. Next in importance scale is the possibility to choose orientation giving reader freedom to hold the device horizontally or vertically. Multimedia features and sound presence also was marked as an important component of magazine reading experience. Surprisingly, test participants gave the least points to social sharing features making it moderately important.

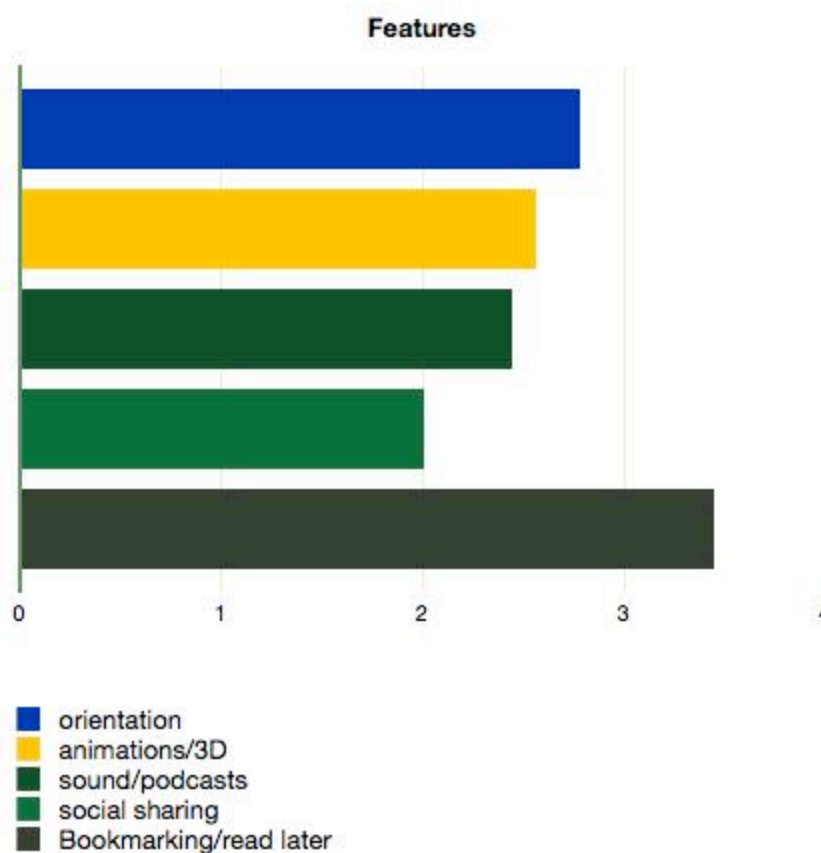


Figure 26

Importance of additional features

9. Conclusion

The aim of this study was to define essential digital magazine format characteristics and examine its influence on usability and reading experience. The motivation behind the research was to address the issue how to plan and design digital magazine format in a way it could deliver convenient magazine reading on tablet devices. To accomplish the goal formats of two digital magazines were examined in order to compare bundled and unbundled layouts.

The problem was first approached through analysis of recent developments in the digital magazine industry finding that digital publishing is still print legacy driven. Circulation control authorities are paying major attention to the print magazine publishers by defining standards for content conversion to digital layouts that restrict significant distinction from its print counterparts. At the same time, digital-only magazines defined as digital publications lack format guidelines discouraging digital publishers to qualify for inclusion into circulation reports. As a result, print publishers are sticking to legacy formats while digital-only publications are still placed into online publishing category maintaining web usability formats.

Print publishing legacy issues also have a tremendous effect on digital magazine authoring workflow. Since the introduction of new digital distribution channels, production became more complex requiring sophisticated content management solutions. The study illustrates how additional format implementations add disproportional effort in production.

Digital magazine production tools are still immature and under development. By following market demand, leading production tools developers are focused on software integration solutions for print publishers rather than creating innovative solutions for digital-only newcomers. As Adam Hyde states: “There is a lot of fuel in these developments and, interestingly, most of it is coming from outside the traditional print and publishing industry. It

could be said that these industries, built upon the printing press, have lost sight of their very foundation.⁴⁴

The most valuable results were expected from reader behavior during empirical experiment. Study finds that readers are not accustomed to digital magazine formats for tablet reading. Two reading patterns were recognized, one that reflects print reading behavior expecting magazine to act like a slide show and other with strong web usage habits treating magazine as webpage. The tests revealed frustrated navigation experience in both magazines caused by the inability to comprehend magazine structure and lack of well-considered guidance. National Geographic scored more errors due to a large amount of the content resulting in more complex navigation structure. However, single story layout also was not as comprehensible as expected. It was found that readers are not accustomed to a single story magazine concept and expect guidance also through single article, which was still perceived as a bunch of different features.

According to test results readers expect digital magazine volume to be considerably lower than in print magazines, leading to the conclusion that single story format is still a viable opportunity in digital magazine landscape. Yet, in order to maintain the meaning of the magazine as a storehouse of information, it would be advisable to compile the magazine from separate content units as components of the story.

This research was fully devoted to digital magazine format in terms of layout, article structure and navigation. The study did not go deep with production technology aspects and related file formats which are subjects for investigation in the future. Magazine discovery and distribution strategies also was not set as a general topic or a part of this work. These issues are closely connected with digital magazine publishing ecosystems—established ones and emerging platforms as well. Magazine publishers name distribution and accessibility crucially important aspects for a digital product expansion since the connection with audiences is essential for business survival. Lastly advertising format and its correlation with magazine content should be properly examined since new technologies allow countless opportunities to automate advertisement placement within the context of the story, track reader engagement and create instant interactions with advertiser's services and sales channels.

⁴⁴ Adam Hyde. *The New Typography*. Replacing the book production ecosystem with webpage production tools. October 18, 2012. Web. 23 April, 2013 <<http://toc.oreilly.com/2012/10/the-new-new-typography.html>>

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Appendices

A Preliminary questionnaire




Preliminary

Age

Gender
 Male
 Female

I own a smartphone

I have experience using tablet device



B Evaluation questionnaire

evaluation

TRVL magazine

Please evaluate your reading experience by marking appropriate answer

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I was able to explore anything that interested me when reading the magazine	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I could return to topics that I had explored earlier.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I could easily explore many topics without getting lost.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I could find topics in several alternative ways	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

TRVL magazine

Please evaluate your reading experience by marking appropriate answer

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I wanted to click on things to see where they would take me	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Visual features of the magazine caught my eye	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I explored many topics that normally I do not examine	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
The magazine encouraged me to browse and explore	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

National Geographic magazine

Please evaluate your reading experience by marking appropriate answer

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I was able to explore anything that interested me when reading the magazine	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I could return to topics that I had explored earlier.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I could easily explore many topics without getting lost.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I could find topics in several alternative ways	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

National Geographic magazine

Please evaluate your reading experience by marking appropriate answer

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I wanted to click on things to see where they would take me	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Visual features of the magazine caught my eye	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
I explored many topics that normally I do not examine	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
The magazine encouraged me to browse and explore	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

Please evaluate importance of following features in digital magazines in general

	Very Important	Important	Moderately Important	Of Little Importance	Unimportant
Possibility to change layout orientation (vertical/horizontal)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Multimedia features (animation layers, 3D objects)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Sound presence (audio footage, article podcasts)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Social sharing - Twitter, Facebook share/like functionality	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Opportunity to favorite/bookmark topics for reading later	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

For a regular digital magazine publication I'd prefer to receive new issues

- Daily
- Twice a week
- Weekly
- Every two weeks
- Monthly

Fixed publishing dates/day of the week/month for digital magazine is

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant

Evaluate the following statements.

	one minute	2-3 minutes	4-7 minutes	8-15 minutes	16-30 minutes	30+ minutes
Ideal article length in a digital magazine is one I can read within	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I would expect the length of a magazine reading session to be	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6

Evaluate the following statements.

	half page	1 page	2-3 pages	4-7 pages	8-15 pages	16-30 pages
I'd prefer average digital article volume WITHOUT pictures and illustrations to be	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
I'd prefer average digital article volume INCLUDING pictures and illustrations to be	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6

I'd prefer total volume of digital magazine to be

- 3-5 pages
- 6-15 pages
- 16-30 pages
- 31-50 pages
- 51-100 pages
- 101-200 pages
- 200+

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D Kokkuvõte (Summary in Estonian)

Käesoleva magistritöö eesmärgiks on defineerida digitaalse ajakirja formaadi karakteristikud ning uurida nende mõju lugemiskogemusele. Algitõuke uurimistööks andis soov ja vajadus lähemalt vaadelda ühe-loolise ajakirja kontseptsiooni elujõulisust. Selline ühe-looline ajakiri on iseäranis sobilik kirjastamisformaad uuele mobiilipõlvkonnale.

Uurimisvaldkonnaks on digitaalne kirjastamine. Peamiselt on magistritöö fookus suunatud tahvelarvutitele mõeldud digiajakirjadele. Trükiajakirjade kirjastajad ja veebikirjastamis-taustaga ettevõtjad lähenevad uuele digimeediumile eksperimenteerides nii vormi, sisu kui leviga.

Veel ei ole kehtestatud üldisi standardeid digiajakirjade formaatidele ning digiajakirja definitsioon on senini olnud küllalt laialivalgus.

Uurimustöö vaatleb trüki- ja digiajakirjade kirjastamise tööprotsesse ning analüüsib nende eri formaatide vastastikkust integreerimist. Teoreetilise sisuga peatükid sisaldavad lisaks digiajakirja formaadi komponentide ning autoriseerimisvahendite ülevaadet.

Läbi viidi ka praktiline eksperiment, et tuua ilmsiks digiajakirjade formaadis peidtuvaid kasutatavusprobleeme. Testiti kahte olemasolevat ajakirja – traditsioonilise paberajakirja digiversiooni ning sidumata trükise formaati esindavat ühe-loolist digiakirja. Kasutatavuse analüüsiks tarvitati erinevaid meetodikaid: heuristiline analüüs, vaatlus, küsitlus.

Uurimistöö tulemusel leiti, et võrreldes traditsiooniliste ajakirjadega eelistavad digiajakirjade lugejad senisest väiksemat sisumahtu. Uurimistöös tuuakse esile, et kasutajatel ei ole harjumust tahvelarvutill ajakirju lugeda. Veel jagatakse soovitusi kasutatavuse parandamiseks ja meeldivama lugemiskogemuse saavutamiseks. Kokkuvõtteks leitakse töös, et ühe-loolised ajakirjad on heaks võimaluseks digitaalajakirjade, maastlul. Teema on kindlasti väärt edasist uurimist.