Category, Time, and Space: Structures in Cross-Media Design and Production

Mattias Arvola
Department of Computer and
Information Science
Linköping University, Linköping,
Sweden, mattias.arvola@liu.se

Mathias Broth
Department of Culture and
Communication
Linköping University, Linköping,
Sweden, mathias.broth@liu.se

ABSTRACT

The purpose of this empirically informed, but mainly conceptual paper, is to understand what we might mean by the word 'structure' in cross-media design. The paper draws upon a workplace study in print and online news production at a Swedish local news publisher, where we observed the work of reporters, page planners and web editors. Structure in the context of cross-media design and production is initially defined as the pattern of arrangement of elements in the media. We identified three kinds of structure in our observations of the journalists' work: category, time, and space. Category: how knowledge is ordered is foundational and explains how functions and content relate to each other. Time: the temporal structure is how functions and content are ordered in time (what comes before and after). Space: The spatial structure is the layout of functions and content in 2-dimensional or 3-dimensional space. These three kinds of structure have corresponding design representations in interaction design: concept maps, flow charts, and wireframes.

CCS CONCEPTS

• Human-centered computing~Interaction design theory, concepts and paradigms • Human-centered computing~Empirical studies in collaborative and social computing • Applied computing~Publishing

KEYWORDS

Cross-media production, News publishing, Structure, Interaction design

1 Introduction

In this conceptual paper, we aim to understand what we might mean by the word 'structure' in cross-media design and production. It builds on a workplace study where we observed the work of page planners, web editors, and reporters at a local news publisher. We discuss what the results mean for their work practices, and what they mean for how we conceptualize cross-media design.

Structure in the context of cross-media design and production can initially be defined as the pattern of arrangement of elements in the media. This includes the layout of contents and to the action sequences with which functions are used [1]. This can form a flat or deep tree hierarchy or network depending on simultaneously presented contents or stepwise linear sequences [11]. Action sequences form tasks where one action depend on the completion of another, and functions and contents can be arranged into a syntax of commands, arguments, contexts, and variables [8].

In interaction design, the structural level is only one of several levels of abstraction. Other levels has been suggested to include the conceptual level, the functional level, the interaction level, and the presentation level [1, 2]. The conceptual design level is the idea or purpose of the design and its intended use. That is, what the product should do and be, including a definition of the use situation in terms of who does what, why, when, where and how. The design drivers, principles, overarching character and gestalt of the design as well as its genre and posture in relation to the user belong the conceptual level. The functional design level is the actions that can be taken, and the materials and contents used for the actions. This level concerns the functions and the contents needed to fulfil the purpose and intended use of the design concept. The interactional design level specifies the ways that functions and contents can be manipulated and interacted with. How the user makes use of contents by means of different interaction styles and interaction techniques belong to this level. Finally, the presentational design level is the look and feel of the design. This level concerns what meets the senses. It is the graphical part of a user interface, and style and composition are important here.

Effects of design decisions made at one level are not isolated to that level and all decisions potentially affect the user experience [3]. The design process moves largely from the abstract and general to the concrete and detailed, but not in a linear fashion [8]. It involves transpositions between the levels as consequences of experimental design moves propagate between them [3, 7, 9].

2 Workplace Study

The news publisher where we did the workplace study had four printed newspapers in four different cities, six web sites, and two broadcast TV channels, with in total about 140 journalists. In one town, there was an online newsroom with reporters for one of the papers, sports for all papers, and page planning for all printed papers. In another town, there was an online newsroom for another paper, the web hub, and the video news. There were also online newsrooms for the two other papers, as well as small offices with local reporters in yet other towns. The overall objective of the media company was to produce high-quality local news. For the printed news, the page planners had the goal of filling the paper with deep material. For the web editors the goal was to get as many readers as possible on the web sites measured in click rates and reading times. One reason for separating the production of print and online news media was the differences in reading patterns. Online news involves very short reading times, counting in minutes and seconds only, while a printed newspaper is read for a longer time, often up to one hour per paper. The rhythm of the production cycle is continuous and short for online news, and daily for the printed news [5].

The workplace study used a qualitative interpretative methodology based on participant observation. In total, 40 hours of observation were made out of which 16 hours with two observers simultaneously. When two observers were present, one of them took a complete observation stance, and the other took the stance of an observer-as-participant [6]. The observations were loosely structured according to Burke's pentad [4]: act, agent, scene, agency, and purpose. Written up field notes resulted in a 20-page document of about 8000 words. A thematic bottom-up qualitative data analysis method known as the KJ method [10] (a.k.a. affinity diagramming) was employed. Three researchers participated in the analysis, two of whom also made the observations. The bottom-up analysis was followed by a top-down interpretation in light of the theoretical background concerning different kinds structure and design levels. With regard to our focal interest in understanding what 'structure' might mean in cross-media design, our observations yielded results ordered into three themes: Category, Time, and Space.

3 Category

A first identified kind of structure concerns the categorization of news, i.e., the arrangement of the news into categories, and how these relate to each other. The overarching categorization in the news production relates to the *different channels*, namely, the question of what news should be published in what papers and on what sites. The *origin* of an article (local reporters, national reporters, news agencies) is also used by the editors to categorize content.

The newsroom manager strives to produce a good combination of different kinds of news, for example, hard and soft news. Soft news can be lifestyle pieces like trends in gardening, while event news and crime are examples of hard news. Other categorizations include follow-up articles and new versions of an article for different papers or sites. The status of articles found in the publication plans is another basis for categorization. They are prepared with headings like "To Come During the Day"; "Completed"; "To Check" (news tips, long shots); and "Can Be Kicked Out".

In every newspaper, there is a categorization based on the different departments of the paper (e.g. sports, business), and each department has a certain number of pages at different places in the newspaper, depending on the choice of layout framework. The departments are less dominant on the websites even though they form a navigation structure. For the printed papers, the departments build a connection from categorization to spatial aspects (where to place an article). Some departments are only included during certain days of the week. This is a connection from categorization to temporal aspects. Some departments are also connected to the places and towns that the news item is about.

For the websites, the categorization is dominated by the assessment from the different online newsrooms about how much traffic and how many page views a news item will generate. News items that have potential to be read by many should not be hidden away but published high up on the first page when there is a chance that many will read it, preferably around lunchtime or in the evening. The separation of news that are expected to attract a lot of traffic from news that is expected to attract less traffic builds a connection from categorization to spatial structure (where to place an article) and temporal structure (when to publish).

4 Time

Another kind of structure is the temporal structure. That is, how tasks and actions are ordered in time, i.e. what comes before something else, how things are segmented, and what happens in parallel. Web editors' goal is a steady flow of web traffic to the sites, which means a *regular update cycle* with new articles every 2–3 hours. The number of page views has a *monitoring cycle* at both a 15-minute and a daily basis. When traffic is low, the web editors starts to re-write blurbs, change photos, and re-order articles on the sites. The web editors also think that some contents work better during the morning while other contents work better during the evening. Updates for the night and early morning are planned the evening before and are automatically published on the website at pre-scheduled times.

There is a daily meeting about what should be published when, involving the web hub team leader, the web editor responsible for one site, and the video manager. This meeting

takes place when the team leader at the web hub gets the lists on what material will be ready during the day from the different local newsroom managers. The lists arrive around 9 am. at which the web team leader compiles them and re-arranges them according to when different news items should be published.

For the printed papers, the layout frameworks, advertisements, and fixed content for the day after tomorrow are set at 3 pm, which gives the page planners a basis to begin work in the next morning. The printed papers go to the printshop at 10–11 pm. On Fridays they need to plan not only the Saturday paper, but also the Monday paper (there is no Sunday paper). The work follows a daily cycle, but there is also a less dominant weekly cycle. At the same time, the web hub needs to save away news for the weekend when less is produced. The material can often be scarce as the team follow a principle of not publishing items that have already been published in the printed news.

We observed that the daily cycle for the page planners affected their division of labor. Each page planner is assigned as responsible for one particular newspaper. Additionally, one of the page planners has evening work. We also observed that the 15-minute cycle with constant updates at the web hub also affected their division of labor. They have one team leader and three web editors assigned to four web sites, and they work in four teams on three shifts. During the day the supporting team run the sports, work as desk reporters responsible for blue-light news and prepare for the weekend. Work tasks are also assigned dynamically by the web hub team leader as they come in.

5   Space

Further, our observations also concern spatial structure. That is, how articles are arranged in space, i.e. the layout of the papers and the sites. The printed news is more focused on the space than the online news. The spatial structure of the web site is controlled by the layout grid, which is dominated by a *one-dimensional vertical layout* in which the web editors only decide when a news item should be moved higher up or further down on the site to generate traffic. The page planners work instead with *two-dimensional layout* on every spread, and the choice of at what page to place an article makes it a *three-dimensional layout*. The lists of news to come specifies also the expected number of characters for articles, and page planners can see how much space is needed for a particular item. They can also tell the reporters what text length they need.

The layout framework for the printed paper is, as earlier mentioned, chosen the day before, and it specifies the available space for news text and images. Particular grids for separate pages are then chosen and the produced articles placed into those grids. The choice of photos is an important part of the work. The editors at the page planning unit have to consider space not only for articles, but also for advertisements. In contrast, web editors do not have these concerns.

6   Conclusions

The categorization is a crucial basis for deciding where a news item should go in the spatial structure of the printed news, and the navigation structure of the online news. The web editors ordered their work in accordance with the temporal structure of 15-minutes cycles. The questions of when to publish a news item and when to change its blurb in order to drive web traffic were at the forefront. However, at the page planning, the work was ordered in accordance with spatial structure. For page planners, the questions of where to publish and how to place the news in a layout framework were at the forefront. Therefore, as noted also by Bødker and Petersen [5], we could see that the cross-media structure gave rise to different editorial practices with different rhythms and concerns.

We could also observe that the structural aspects propagate consequences for the other design levels. As noted in earlier research, design considerations cannot be contained to one level of abstraction [3, 7, 9]. The temporal structure of the web means that editorial practices have the goal of constant updates. This is a propagation of consequences to a concept level. On the functional level, the hyperlinked structure of online news also opens opportunities for associations between related news that are not governed by genre conventions, and therefore tagging functionality should probably be included. There is also a dependency between the structural level and the interaction level. For example, the serial and categorial structure of the printed news relates to how readers interact with the newspaper by turning pages from the frontpage to the back.

I sum, we have shown how journalists orient to three kinds of structure that could usefully be considered in cross-media design: categorization, temporal structure, and spatial structure. Categorization describes how entities (functions and contents) are named and classified, and how they relate to each other; temporal structure refers to how entities are ordered in sequence, in parallel, in cycles, and at different rhythms; and spatial structure concerns how functions and contents are laid out in a two- or three-dimensional space. Our working hypothesis at this stage, is that an experience of causality depends on both spatial and temporal structure (where things are when) and is explained by categorization (an understanding how things are separated and related). In cross-media interaction design, we propose to start with card-sorting to work out the foundational categories, which can be represented in a concept map, content inventory, or entity relationship diagram, before how to order the timing of events and actions in flow charts or use cases, and how to use space in wireframe drawings.

7   ACKNOWLEDGMENTS

REFERENCES

[1] M Arvola and H Artman (2007). Enactments in Interaction Design: How Designers Make Sketches Behave. Artifact, 1(2), 106–119. DOI: https://doi.org/10.1080/17493460601117272.

[2] J Blomkvist and M Arvola (2014). Pausing or Not? Examining the Service Walkthrough Technique. In Proceedings of the 28th International BCS Human Computer Interaction Conference on HCI 2014 - Sand, Sea and Sky - Holiday HCI (BCS-HCI '14). BCS. DOI: https://doi.org/10.14236/ewic/hci2014.18.

[3] W Buxton (1983). Lexical and Pragmatic Considerations of Input Structures. SIGGRAPH Comput. Graph., 17(1), 31–37. DOI: https://dx.doi.org/10.1145/988584.988586.

[4] K Burke, 1969. A grammar of motives. University of California Press, Berkeley and Los Angeles.

[5] S Bødker and A.B Petersen (2007). Seeds of Cross-Media Production. Computer Supported Cooperative Work (CSCW), 16(6), 539–566. DOI: https://doi.org/10.1007/s10606-007-9056-1.

[6] B.B Kawulich (2005). Participant observation as a data collection method. Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 6(2), Art. 43. Retrieved from http://nbn-resolving.de/urn:nbn:de:0114-fqs0502430.

[7] J Löwgren and E Stolterman. 2004. Thoughtful Interaction Design: A Design perspective on Information Technology. MIT Press, Cambridge.

[8] T Moran (1981). The Command Language Grammar: A Representation for the User Interface of Interactive Computer Systems. Int. J. Man-Mach. Stud., 15(1), 3–50. https://doi.org/10.1016/S0020-7373(81)80022-3.

[9] D.A Schön (1992). Designing as Reflective Conversation with the Materials of a Design Situation. Research in Engineering Design, 3(3), 131–147. https://doi.org/10.1007/BF01580516.

[10] R Scupin (1997). The KJ Method: A Technique for Analyzing Data Derived from Japanese Ethnology. Human Organization, 56(2), 233–237. DOI: https://doi.org/10.17730/humo.56.2.x335923511444655

[11] B Shneiderman, C Plaisant, M Cohen, S Jacobs, N Elmqvist and N Diakopoulos 2017. Designing the User Interface: Strategies for Effective Human-Computer Interaction (6th. ed.). Pearson, Harlow.