Expressing Segmentation in d-Comics

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Abstract. Comics as a storytelling medium is constructed by panel sequences. The comics author defines how the panel sequences are segmented with specific storytelling intentions to enhance aspects such as: curiosity, suspense, surprise, emphasis, storytelling pace, etc. In printed comics, the intended segmentations are embodied because they are physically printed on the pages. However, different electronic devices that have different screen sizes and support different ways of interaction can all gain access to the same panel sequence of d-Comics (digital comics). Therefore, the question emerges how to express author intended segmentations in d-Comics. This article collects several design prototypes that explore the relationship between narrative structure, visual space, and interaction in d-Comics. Prototype 1 discusses how the background layer can express the segmentation. Prototype 2 explores how differences in movement speed of visual layers can express segmentation. Prototype 3 visualizes different shape changes when a reader interacts with the panel sequence to express segmentations. Prototype 4 explores different layouts of panels with interactivity linked to zooming in and out. And finally, prototype 5 uses spatial distance to show segmentations.

Keywords: Interactivity · Digital comics · Layout

1 Introduction

Comics as a storytelling medium is constructed by panel sequences [1, 2]. The comics author defines how the panel sequences are segmented with specific storytelling intentions to enhance aspects such as: curiosity, suspense, surprise, emphasis, storytelling pace, etc. In printed comics, the intended segmentations are embodied because they are physically printed on the pages. However, different electronic devices that have different screen sizes and support different ways of interaction can all gain access to the same panel sequence of d-Comics. Therefore, the question emerges how to express author intended segmentations in d-Comics.

Based on previous experiments [3, 4], we proposed a new vocabulary to describe how panels are segmented in d-Comics – Phasel:

A *phasel* (created by combining "phase" and "sequel") in d-Comics is represented by one panel or multiple panels that belong to each other. The author cannot

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decompose these further into smaller phasels. A phasel describes a strong relation among a certain number of panels and a significant difference with other phasels, determined by the author's interpretation.

2 Designed Prototypes

With the understanding of the vocabulary, we explored the design space of d-Comics with several prototypes. We created a twenty-four panels comics – Hedgehog Day – and identified eight phasels (Fig. 1).

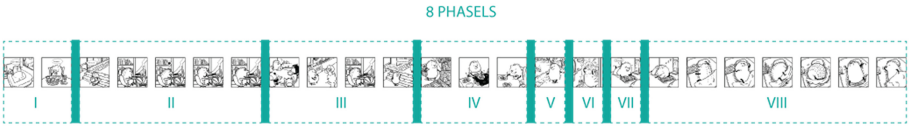

Fig. 1. The twenty-four-panel-comics with 8 phasels.

2.1 Prototype 1: Background

The spatial arrangement as a panel segmentation strategy has several aspects such as the spatial distance between panels and different visual elements. To express a phasel gap, the common practice would be to increase the spatial distance of the phasel gap (Fig. 2).

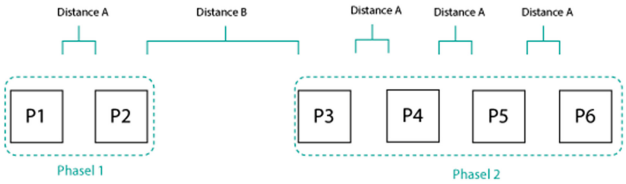

Fig. 2. Example of different distances between phasels.

Prototype 1 explores the "environment" aspect in the visual elements to express panel sequence segmentation. But instead of altering drawings inside panels, this prototype uses the space outside the panel. Each panel can be considered as one visual element, and the rest of the visual space displayed on the canvas would be the environment—since in the digital environment there can be different digital layers. Figure 3 illustrates the appearance of prototype 1. A panel sequence is placed horizontally on a virtual canvas. The background (environment) of Phasel 1 is wood grain, while the background of Phasel 2 is sand. When the reader scrolls through the panel sequence, the background changes based on the current phasel to which the current panel (the panel in the centre of the display) belongs to.

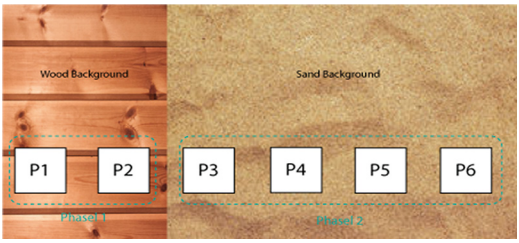

Fig. 3. An example of using differences in background to express segmentation.

The environment difference could be varied with other patterns. Different colours could also be applied for expressing the segmentation.

2.2 Prototype 2: Moving Speed of the Background

In the digital environment, images can be placed on top of each other in virtual layers. This is different from print comics where there is only one static layer, including the background. Moreover, in d-Comics interactions can be used to move between different layers. For example, the user could drag the background, while the foreground remains at the same place. One existing example of separating panel layer from the background layer is *The Boat* from Huynh [5]. The foreground layer contains the static panels, while the background layer is one animated sea image. Another example of using layers can be found in Stu's [6] *These Memories Won't Last.*

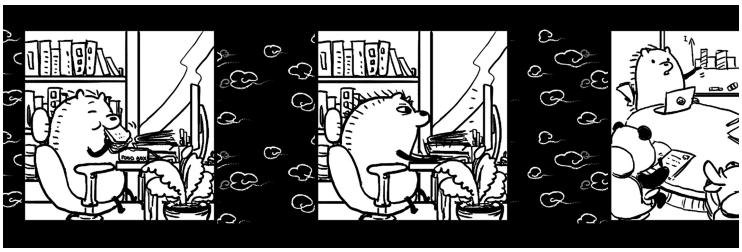

Fig. 4. A screenshot of Prototype 2

Figure 4 is a screenshot of Prototype 2, which has two layers: the foreground layer for placing the panels, and the background layer for the cloud image. The panels are the twenty-four panels created by the author of this article. The cloud image has been designed and programmed (using HTML, CSS and JavaScript) to occur constantly so that it appears as an infinite cloud background. The two layers all react to the same vertical scrolling input. When the reader scrolls the panels, the moving speed of the front layer remains the same. However, the background layer moves faster when it is a phasel gap, and slower when it is a normal panel gap. The reader can observe the differences only when interacting with the d-Comics. Once the interaction is stopped, both the foreground and background become static.

2.3 Prototype 3: Shape Change

The idea of this prototype is to consider the panel gap as a visible object. Figure 5 illustrates the mechanism of the prototype. Each panel gap has the same appearance when there is no input from the reader. The reader can scroll horizontally to move the panel sequence. In reaction to the reader's input, the visual gaps within a phasel change shape less dramatically than when there is a phasel gap. The visual effect is to mimic an elastic effect.

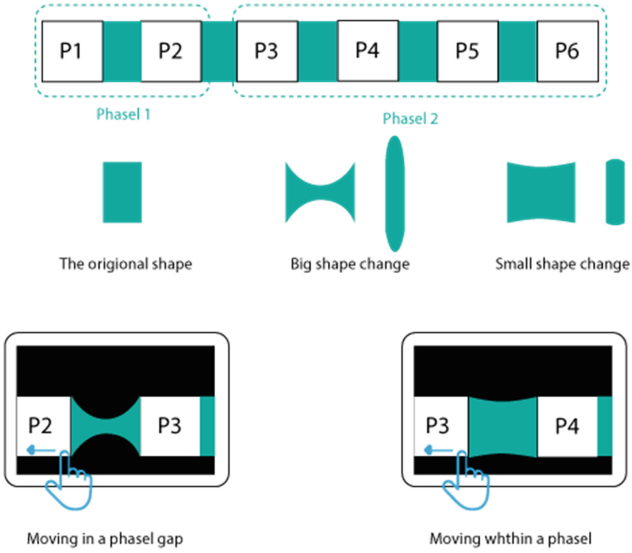

Fig. 5. A prototype in which different shape changes are used as the output to express segmentation.

2.4 Prototype 4: Zoom

Two existing examples of applying a zooming effect in d-Comics are McCloud's [7]. *The Right Number* and the zoom version of xkcd's *Click and Drag* adapted by Wesch [8]. Prototype 4 contains two sub-prototypes with different panel layouts: 4A and 4B (Fig. 5). The twenty-four-panel comics were applied with two different layouts. The prototypes were programmed with HTML, CSS and JavaScript. The zooming interaction relies on the two "zoom in" and "zoom out" buttons located on the bottom right of the screen. Layout 1 starts with Panel 1 as the first stage. When zooming out, the presentation zooms to four, nine, sixteen and twenty-five panels in four steps. Layout 2 applies a zoom out starting from Panel 1 in the centre of the panel sequence, zooming to nine and twenty-five panels in only two steps. In both Layout 1 and 2, a guiding line has to be applied to indicate the reading order to the reader. The reason that the two layouts with the same zoom interaction require a different number of steps is that we have defined that each zoom in input should make at least one more panel visible. Then because of the different layout, the required steps to view a certain number of panels are different (Fig. 6).

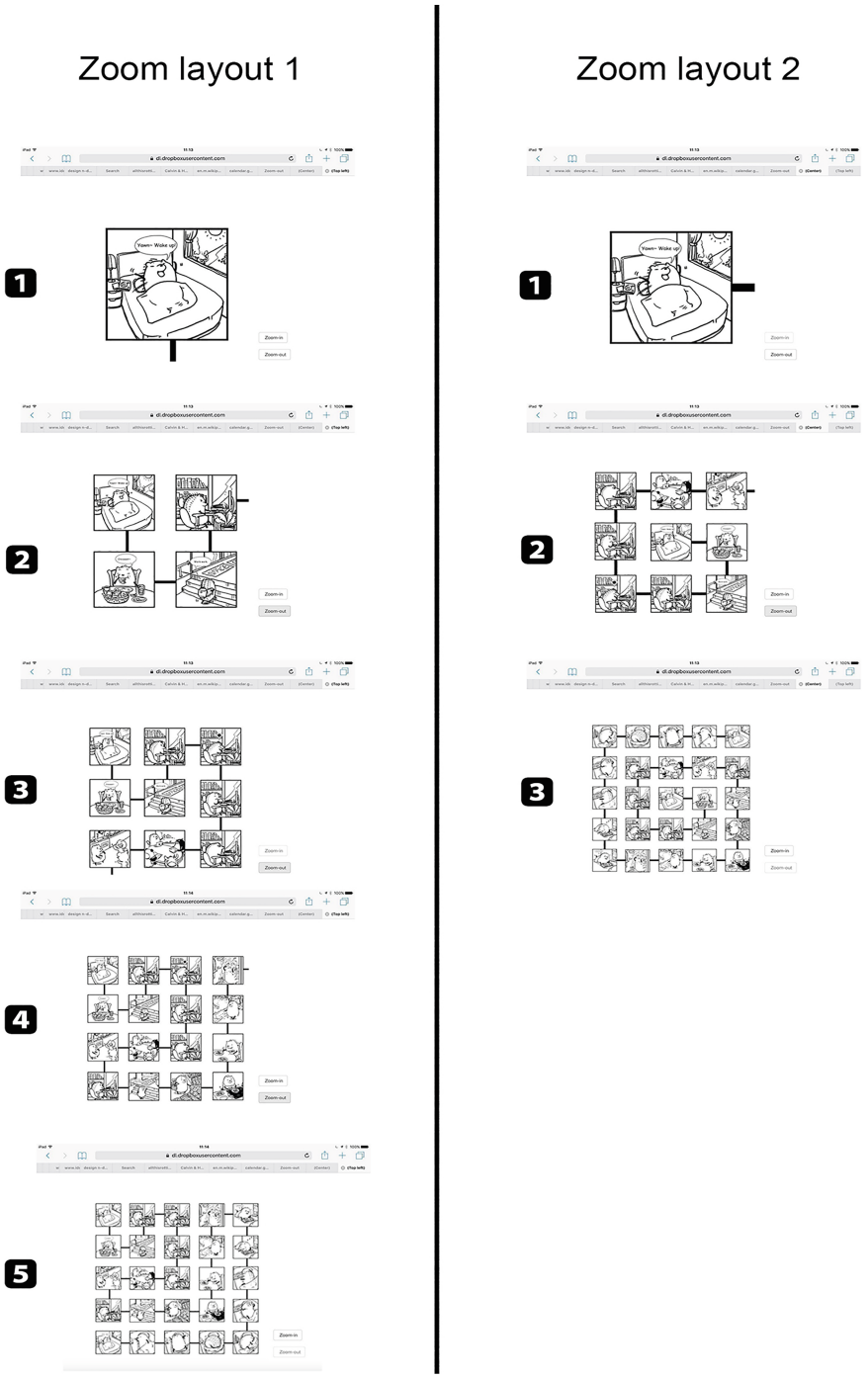

Fig. 6. Zoom layout 4A (layout 1) and 4B (layout 2).

2.5 Prototype 5: 3D Virtual Space

Prototype 5 aims to explore the three-dimensional virtual space. The author made 24 panels and identified eight phasels. The phasels were adopted and placed in three-dimensional virtual space in Unity. As Fig. 7 shows, panels that belong to the same phasel were placed horizontally on the x-axis, while different phasels were located vertically on the y-axis. By converting this setting with ARToolKit, we were able to experience reading d-Comics in Augmented Reality from a tablet. Figure 8 is a screenshot of the tablet used to read this prototype. The starting position was standing straight and holding the tablet perpendicular to the floor. By moving the tablet horizontally, we can see panels in the same phasel. By moving the tablet forward or backward, we can switch between phasels.

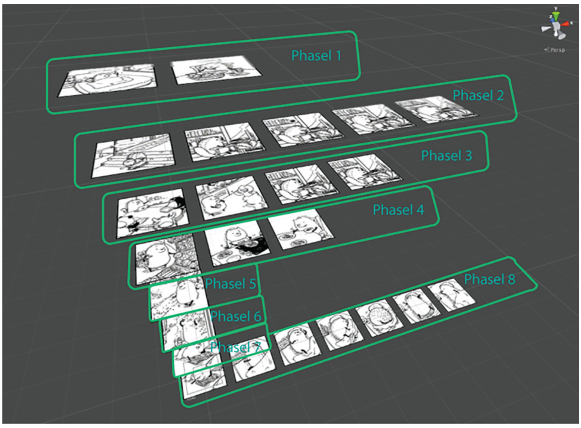

Fig. 7. An example of using the x-, y-, and z-axis to express segmentation.

Fig. 8. Screenshot of the augmented reality prototype made using unity and ARToolKit.

The problem of this prototype is that when a small phasel is on top of a large phasel (for example, Phasel 1 and Phasel 2), the large phasel won't be visually covered. Therefore, when reading Phasel 1, the reader can already see some panels in Phasel 2. One solution could be to use an angle between the phasels to separate them on different axes. For example, Fig. 8 shows a rebuilt 3D virtual space where the phasels are rotated 90°. The spatial arrangement will bring many interesting challenges, such as how to create a good 3D digital panel segmentation in virtual space (Fig. 9).

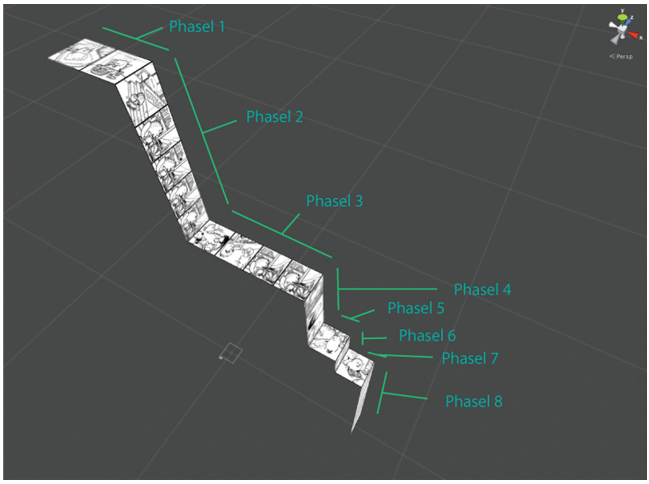

Fig. 9. Improved 3D scene where the rotation has been used to express segmentation

3 Conclusion and Future Work

To summarize, the prototypes described in this article explored the combination of visual space (the distance between panels, the background layer change of all panels, zoom in/out, virtual 3D space) and interaction (scrolling, dragging, moving the tablet in real space), with the purpose of expressing the panel sequence segmentations in d-Comics. The relation of segmentation with narrative structure, visual space and interaction can be described as tight and complex. This brings also the design space for exploring the storytelling possibilities. The future work will further explore how to bridge the author's storytelling intention with narrative structure, visual space and interaction.

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