Public Transport Commuting as a Cross-channel Experience in Blended Space

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Abstract
This paper describes an exploratory study conducted in 2015 on the public transport system in the city of Karlstad, Sweden. A heuristic approach to cross-channel experience design was used to assess the overall structure and fittingness of the actor-driven ecosystems centered around public transport commuting and created by the interactions between the Karlstad public bus company, Karlstadsbuss, its multiple touchpoints, actors wanting to travel within Karlstad, and the city environment itself.

Author Keywords
Cross-channel; blended space; contextual blending; place; place-making; user experience; information architecture; public transport.

Introduction
Benyon and Resmini characterize cross-channel ecosystems as the result of actor usage and aggregation of any number of touchpoints into a cohesive goal-oriented architecture. Cross-channel ecosystems are co-produced systems of blended spaces. Benyon [1] defines a blended space as a space “where a physical space is deliberately integrated in a close-knit way with a digital space” (p. 79). However,
not only can individual systems or elements within the ecosystem be individual blended spaces, but the whole ecosystem itself is a blended space. This implies that blends might happen between digital and physical spaces that are somehow separated and only connected semantically. These ecosystem-wide blended spaces support fluid, purposeful, seamful, stateful movement that can be modeled according to the principles of embodied cognition and conceptual blending.

In order to illustrate the approach to designing cross-channel ecosystems and blended spaces we explore the case of a consultancy for a Swedish bus service provider [2]. The question posed was "Is Karlstadsbuss providing a good experience for public commuting into the city center".

The main elements taken into initial consideration for the conceptualization of the cross-channel ecosystems itself in the course of the study were a number of individual actors, whose desired future state was framed through the common macro activity of "commuting for work to the city center", the digital and physical touchpoints offered by Karlstadsbuss, including for example the company’s web presence, its mobile app, its printed customer information, and its staff, and the city environment, signage, distances, and city layout.

Primary data was acquired through interviews, surveys, and direct observation on site. Actors were requested to describe what "commuting for work" meant for them, what was their general goal (with results including to travel comfortably, to be on time, to save money, to protect the environment), and to describe in detail their usual "path" from home to work and back. In all, 19 commuters were interviewed using semi-structured interviews to understand their individual experiences. Immediate evidence showed that actors were following personal, different paths even when they moved through all or most of the same touchpoints, as the sequence in which these were accessed varied from interviewee to interviewee.

**Cross-channel experiences**

Actors conceptualize their path as starting with the purchase of a bus card at a kiosk, school, or at the Karlstadsbuss customer center. Then actors typically obtain information on their journey through the travel planner. Next, they walk to the bus stop. Once their bus arrives, actors board and validate their trip at the bus card scanner (Figure 1).

While touchpoints were easily extracted from the interviews, from data acquired at Karlstadsbuss, and observation on site, identifying the channels was a laborious and extremely delicate process, requiring a number of compromises to accommodate the different points of view within the team and within Karlstadsbuss, and resulting in the formalization of six channels, among which "bus system" and "printed media", all of them offering a variable number of touchpoints in both digital and physical space. The "printed media" channel for example included paper tickets, booklets, QR codes, the bus timetables, the bus lines maps, and turkronor, a company-issued currency for tickets. The "bus system" channel included physical touchpoints such as individual bus stops and digital touchpoints offering the possibility to verify the location of a given bus in real time.

Frequent overlaps, with touchpoint belonging to multiple channels and fuzzy channel boundaries, were accepted as a necessary result of the sectioning criteria used to accommodate the organization’s own view of their role in the ecosystem and facilitate understanding.
For example, “printed media” was actually a compound channel comprising “travel information”, “company information”, “environment information”, and “traffic information”, brought together to facilitate alignment with Karlstadsbuss’s own conceptualization of their services.

Having mapped the different paths through the ecosystem allowed the team to also create rough representations of the elements through system maps showing the ecosystem topology. These were then normalized into a series of synthetic views to which Resmini and Rosati’s cross-channel heuristics [3], placemaking, consistency, resilience reduction, correlation, were applied to verify the degree of fitness of the current organizational strategy and efforts to the actual patterns of usage and role played by each element in the ecosystem.

The ecosystem was graded in terms of its capability to structure a comprehensive sense of place; to be conceptually consistent across the different mediums it was deployed through; to offer a degree of resilience and adaptability to individual idiosyncrasies, needs and wants; to reduce the cognitive load connected to choice; and to support correlation as a way to expand an actor’s potentiality for action. Two additional qualities, composition and continuity, were introduced at this stage to explicitly establish the degree of integration and seamfullness of the ecosystem itself.

A matrix identifying the actors’ movements and transitions was created to verify whether desired activities could be carried out moving freely across the different channels, and whether actors were effectively doing so. Both hypotheses were confirmed, with the matrix offering a few supplementary insights, including the fact that crossing channels happened along distinct patterns of usage, with specific channels having no direct movement to or from other channels from specific touchpoints. For example, no direct transition was recorded from Karlstadsbuss’ website to printed materials.

Most importantly, the study verified it was not possible for actors to “commute for work using public transport” in Karlstad without instantiating a cross-channel ecosystem in blended space, as no single touchpoint nor combination of touchpoints belonging only to either physical or digital space allowed to achieve the desired future state all by themselves.

**Blended spaces**

In terms of the blended spaces approach the key to good design lies in finding a structure for the generic space — in terms of four constructs, ontology, topology, volatility and agency — that will underlie the information architecture of the digital and the physical space and the correspondences between them. The information architecture is distributed across the ecosystem through channels and accessed at touchpoints, together with information coming from social and digital space.

The ontology of the bus system explored in the study includes buses, bus stops, lines, routes, journeys, times and destinations. Clearly the physical space has bus stops and these have a topology in which bus stops have distance and directional relations with each other. On one line two bus stops may be adjacent whereas on another line they may be several stops apart. This topology is important as it affects, for example, the time it takes to get from one bus stop to another. The volatility of the physical space is apparent in the movement of buses between bus stops. It is here where the relationships between buses and bus stops...
as described in the timetable may be disrupted by traffic delays. We all know the frustration of waiting for a bus and not knowing where it is or when it will arrive. Agency in the physical space is provided by the bus drivers who can provide information about the space. Agency also includes understanding what people can do in the physical space and how they can affect it. Designers might want to structure digital space to exploit the correspondences between it and physical space. So they will provide displays that show bus stops and their relationships on digital displays, on an app and at the bus stop itself. (We observe here that the route maps at bus stops are part of an information space, but are not digital). By adding in some sensors to the digital space, designers are able to track the volatile real-time movement of the buses, increasing the agency provided by the digital space.

The blended space takes advantage of the correspondences between digital and physical spaces and now has its own properties that emerge from these relationships. In the blended space a commuter sitting on a bus can now have arrival times calculated. A person standing at a bus stop can have a display telling them how late the next bus will be. The agency of the blended space builds on the “commuting to work” function as the digital space enables emergent functions such as “get me home from here”.

**Conclusions**

Cross-channel ecosystems are the result of actor usage and aggregation of any number of touchpoints allowing their interactions with a pervasive layer of information conveyed through channels. Touchpoints and channels may be pertaining to one or more systems or competing services and are freely intertwined into cross-channel ecosystems to pursue a desired future state. These ecosystems are co-produced blended spaces with blends happening between digital and physical spaces that are somehow separated and only connected semantically and that support fluid, purposeful, seamful, stateful movement.

The formalization of cross-channel ecosystems supports and extends the four basic characteristics of blended spaces, ontology, topology, agency, and volatility [1], introduces a conceptual framing for co-production, and presents an opportunity for a more strategic approach to the design of systemic user experiences. Blending theory encourages designers to look at physical and digital spaces in a systemic manner, focusing on how they can work together to provide better experiences, and how people can transition and move across touchpoints and channels to achieve their goals.

The conceptualization and design of complex user experiences can be improved by pulling back from the details of screen design and interaction moments and considering instead the digital / physical cross-channel ecosystem, focusing on the structures, movements, and transitions necessary to strengthen and reinforce the actors’ sense of place in blended space.

**References**

Figure 1 A typical user journey through the commuting to work by bus ecosystem