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Relating Systems Thinking and Design
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Visualising Systems as Stories in Narratives

Comics and storyboards

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Designing involves making decisions that affect the living and non-living things of the world. It undertakes the responsibility of answering what to design, how, and why, and consequently, determines the lifecycle of artefacts. Designers are supposed to be aware of these responsibilities and evaluate the context and necessity of their designs by studying the footprint of their project in life, considering all related systems.

studioSUSTAIN design studio course, founded in 2017 in the industrial design department at Istanbul Bilgi University,[1] is based on this approach with sustainability at the centre of the design process. Each semester the studio takes a particular locality as the context of design activity. Students are presented with real-life conditions and situations in the local context. They research, experience, and be part of the locality in field trips planned as design camps. They collaborate, work, and live together for a while with locals and stakeholders, participating in their routines, learning local practices and production cycles, and understanding the details and dynamics of local life. They study the tangible and intangible things and processes, in other words, the systems, in the locality.

[1] https://www.bilgi.edu.tr/en/academic/faculty-of-architecture/industrial-design/

Students are expected to think in terms of systems so that they can grasp and understand the local context with the complex social systems and the sociotechnical systems within. They use specific tools and methods for visualising their research on various aspects of the local systems. These tools and methods function both as means of making sense of the local information as well as of collaborating and communicating with locals and stakeholders. Students understand various parts of the local context in relation to sustainability topics. However, in comprehending existing local systems and in composing system designs, they have difficulty integrating and relating these parts and visualising them in system storyboards.

Presented here are the early stages of ongoing research on a proposal for a framework for structuring and visualising systems and system designs. It is suggested that complex social systems or sociotechnical systems can be defined as stories, and their complexity can be grasped and communicated by visualising these system stories in established forms of visual narratives, namely comics and film storyboards. Stories and visual narratives would constitute both a common ground for a mutual understanding of systems as well as for designers to compose and develop system designs through collaboration with stakeholders. The proposal is accompanied by a selection of system storyboards by students of five semesters of studioSUSTAIN.

KEYWORDS: design education, sustainability, system design, system visualisation, story, narrative, comics and storyboard

RSD TOPIC(S): Learning & Education, Mapping & Modelling, Methods & Methodology

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studioSUSTAIN presentation

This research presentation begins with studioSUSTAIN, a design studio course on sustainability, focusing on different localities in Turkey to propose sustainable design projects. Studying localities directly in field trips planned as design camps and collaborating with stakeholders is fundamental to the studio structure (Göksoy & Kıyak

İngin, 2019). The studio adopts processes and methods related to design for sustainability (DfS) and to design practice on "sociotechnical system innovations". System innovation, defined as a "transition from one socio-technical system to another," involves the "transformation of sociotechnical systems for sustainability" (Ceschin & Gaziulusoy, 2016; Geels, 2005). Transition design is a reference to working on the transformation of "technological, social, institutional, organisational" systems (Ceschin & Gaziulusoy, 2016; Irwin et al., 2020).

Each autumn semester, studioSUSTAIN students and coordinators study a local context and propose systems and products that facilitate transition into sustainable futures. Students collect and interpret data on sustainability and locality, using specific tools that help make sense of the complex, dynamic, intangible local information. They consider the local context within long durations of time and across wide areas. Through visioning and past-present-future exercises, they scrutinise the relations between past and present and suggest sustainable futures. Through stakeholders and values diagrams, students document and position stakeholders. Common tools such as the iceberg model, Seeds of Change and SWOT are put in use. Mind maps and mapping exercises help students gather all data together and visualise the connections. Students study existing local systems and propose system designs related to them. They visualise their research and design outputs. Most mentioned exercises have specific visualisation formats; they tackle a portion of the local knowledge and thus are straightforward to understand and visualise. When asked to integrate their findings into system designs and to visualise the data in system storyboards, students have difficulty using and relating all information in system contents and storyboards.

Systems as stories in narratives

Understanding and designing complex social systems are complicated, dynamic, collaborative processes (Jones, 2014). Within a system position of each element, stakeholder and their interrelations are considered across wide places and long durations of time. Systems thinking necessitates thinking in terms of systems, their interrelations, and interactions. Studies suggest that tackling systems as stories and representing them as narratives would facilitate understanding and communicating them (Talgorn and Hendricks, 2021; Winskell and Enger, 2014). Also emphasised is the

need for tools and methods for thinking in terms of systems and visualising them (Hoftijzer et al., 2020). System design methodologies, methods, and tools are still insufficient in the design profession and education (Ella, 2018; Hummels and Levy, 2021).

According to Bruner (1991), "experience of human affairs" takes "the form of the narratives" that are used "in telling about them", adding "the possibility of narrative as a form not only of representing but of constituting reality". Here, it is suggested that complex social systems can be identified as "human affairs", thus as narratives. Then, the basic elements of narratives can be put into use to compose and make sense of systems. A narrative text is where "an agent relates a story in a particular medium." A story is "a fabula that is presented in a certain manner," a *fabula* is "a series of logically and chronologically related events that are caused or experienced by actors," an event is "the transition from one state to another," and actors are "agents that perform actions." Events "take up time" and "occur somewhere" (Bal, 1997). A series of analogies are suggested where a system is defined as a story and the form in which it is related as a narrative, and all content in a complex social system is defined in terms of events, actors, actions, and temporal and spatial specifications. Also, certain features of narratives (Bruner, 1991) may clarify their unique structure for understanding, composing, and communicating systems. *Narrative diachronicity* explains temporality and sequentiality within narratives, *intentional state entailment* includes subjectivity and points of view in narratives, and *particularity* points out the situated content of narratives. Given these distinctive elements and features, narratives are presented as contextual, sequential, linear forms of visualising system content, namely the positions, roles of stakeholders as actors and their acts, the sequence of events within durations, and the particular context of localities as locations, rendering narratives different from above mentioned non-linear, objective tools.

Systems in visual narratives

Upon proposing systems as stories and narratives as means of relating them, two sequential forms of visual narrative are featured as references: comics and film storyboards. Studies emphasising the "expanding field of product design" into systems suggest "graphic novels and comics" as references for the "sketches of the non-tangible"

(Hoftijzer et al., 2020). It is suggested that a framework can be formed relating the conventions of visual language in comics and storyboards with visualising systems and system designs.

A film storyboard is "a series of drawings, not unlike a comic strip, arranged in a sequence to illustrate a story or situation" (Levitan, 1960). It is "the blueprint" of a given "film project", how a story is told in a film (Whitaker & Halas, 1981). Comics are "juxtaposed pictorial and other images in deliberate sequence, intended to convey information and/or produce an aesthetic response in the viewer" (McCloud, 1993). It has been pursuing "to grow as a valid form of reading" and "the deployment of its unique elements takes on the characteristics of language" (Eisner, 1990). Both are established visual narrative forms with their specific codes. These codes, used to visualise all content in a story, are the structural elements of a common visual language shared by many (McLuhan, 1964). The "amplification through simplification" of certain meanings and ideas by cartoon images, text and images complementing and looking like each other, and pages and panels representing elements of the story such as time and space present a glimpse of these codes (McCloud, 1993). Using the visual language of comics and storyboards for creating a framework for system visualisation is proposed as a means of analysing systems, developing system designs, and communicating them amongst designers and stakeholders (see Appendix).

The future chapters of this research will study the content and design of complex social systems in relation to stories and the narrative forms of comics and storyboards while integrating other tools of visualisation used in system studies (Checkland, 2000; Sevaldson, 2011) to build a framework to visualise systems and system designs.

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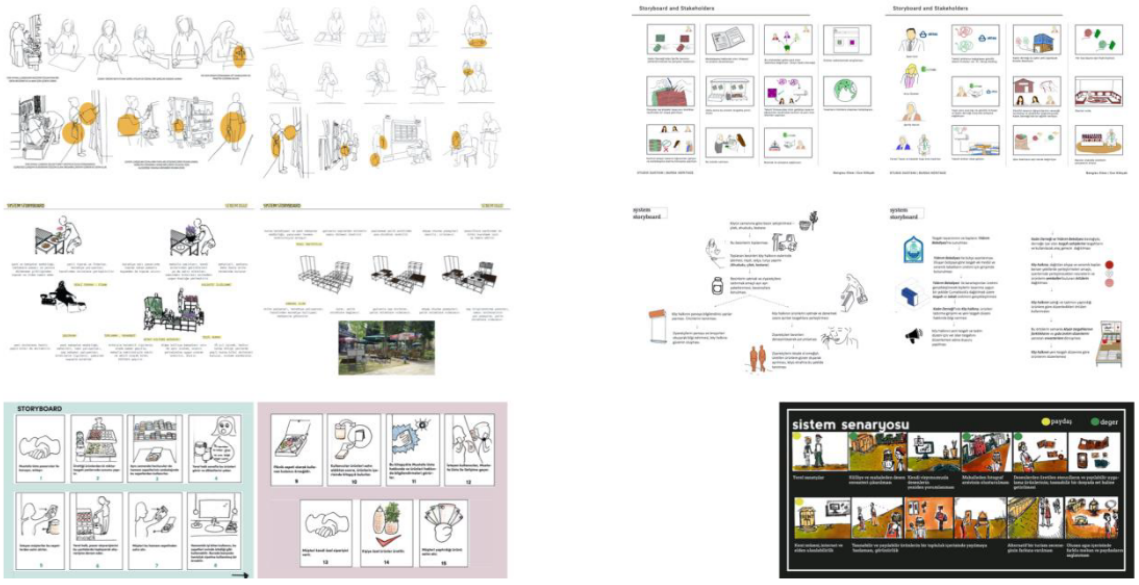
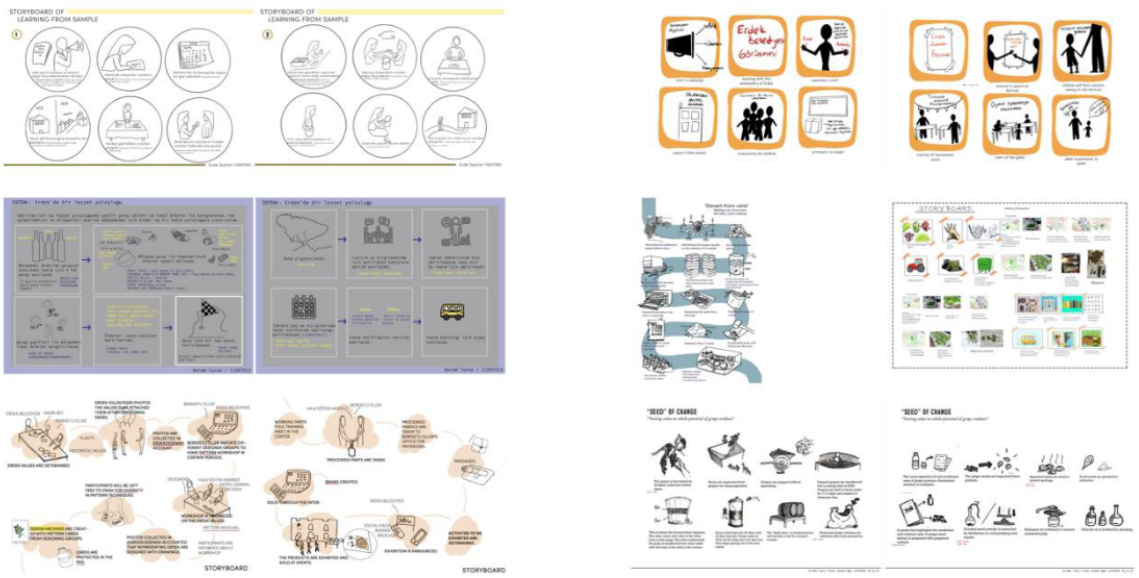
Appendix: Storyboards

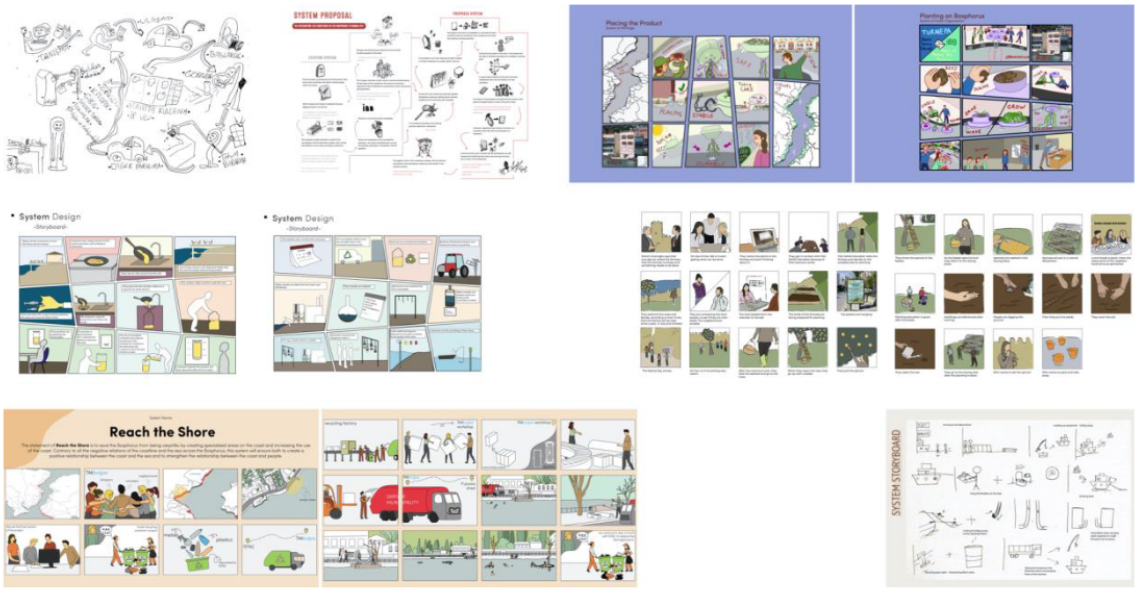
studioSUSTAIN urlaBARBAROS 2017 students' system storyboards



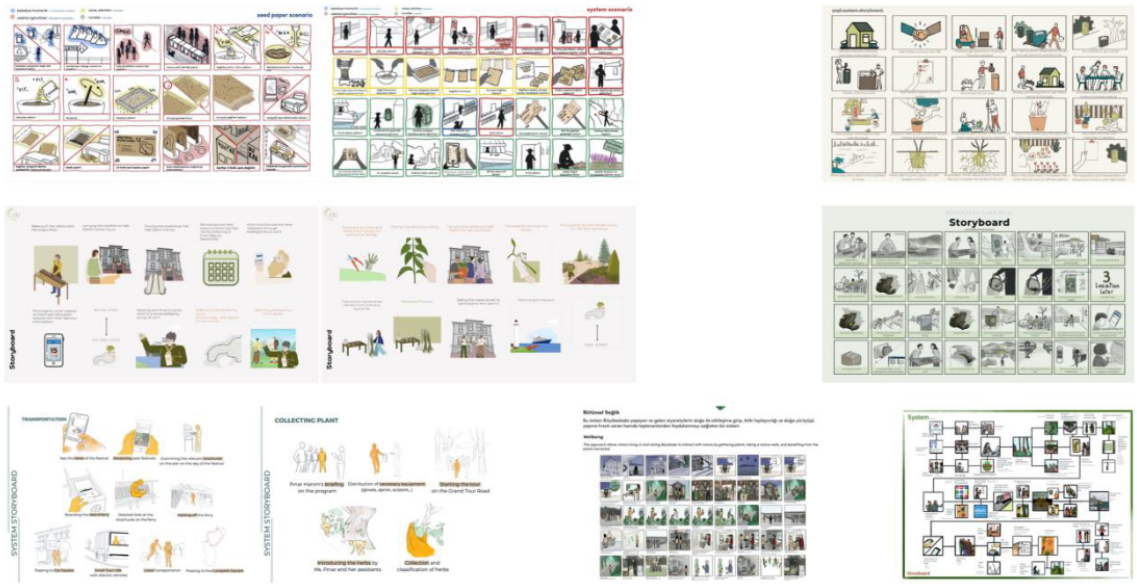
studioSUSTAIN bursaHERITAGE 2018 students' system storyboards



studioSUSTAIN kapıdagERDEK 2019 students' system storyboards



studioSUSTAIN bosphorusATLAS 2020 students' system storyboards



studioSUSTAIN prince'sislesFORESTFILES 2021 students' system storyboards