K(no)wledge Kaleido(scope)

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Exploring the Insight

For centuries, the pursuit of knowledge has led to significant progress and upheaval. This interactive installation invites you to explore the paradoxical nature of the (contemporary) academic practices and dive deeper into this expanding matrix of (stagnating) novelty.

Exploring the theme of “pattern” led us to an intriguing insight that, on an individual level, patterns can be both beneficial and harmful: for instance, implicit pattern detection facilitates language learning, while persistent behavioural or mental patterns can become detrimental addictions. Further examining the patterns on a larger scale, we discovered the tendency to understand human evolution as a series of patterns: dividing time and progress into historical periods, cultural shifts, and knowledge breakthroughs. This led us to question whether the paradox of beneficial and harmful patterns also holds true for broader trends. To explore this further, we delved into the study of Park, Leahey and Funk[1], “Papers and patents are becoming less disruptive over time,” in which they sought to evaluate the state of science by analysing patterns in published papers and patents. Their findings, as supported by various citation- and text-based metrics, reveal a steady decline in groundbreaking discoveries across multiple disciplines since 1945–despite more knowledge produced, we see less “Eureka” moments.

Following the paved path of previous scholars, we tend to submit ourselves to the ad hoc pattern of conducting research. It seems counterintuitive to expect that with the advancement of technology and the accumulation of knowledge, scientific breakthroughs would become less frequent. This observation raises questions about the nature of scientific progress and the patterns that govern it. In the face of rapidly increasing research output, this insight challenges us to examine the factors that contribute to this decline and explore potential ways to disrupt conventions. It reminds us that acquiring patterns and existing knowledge is essential, but we must also be open to chaos and novelty in order to foster true innovation and push the boundaries of our knowledge. Once we have mastered a pattern, we need to seek ways to break it.

Initial Concept Exploration

Our initial statement was, “*Can patterns of knowledge production halt knowledge production?*” Drawing references from the original study, this involves increasing self-citations and a narrower range of effective knowledge as a result of researchers struggling to catch up with the pace of rapid expansion of knowledge.

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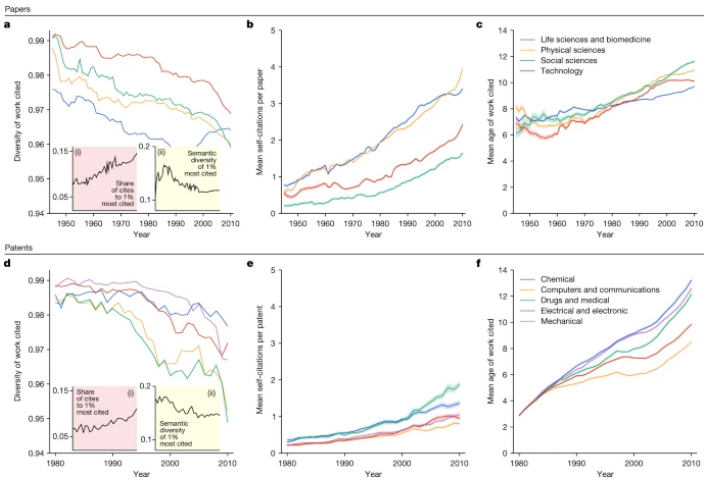
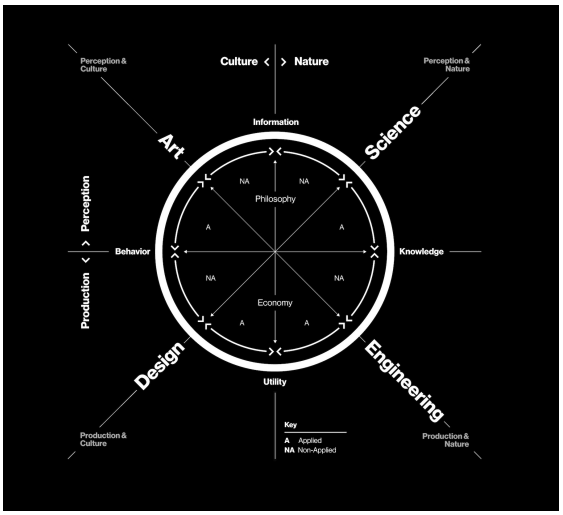
[1] Park, M., Leahey, E. & Funk, R.J. Papers and patents are becoming less disruptive over time. Nature 613, 138–144 (2023). https://doi.org/10.1038/s41586-022-05543-x



Papers and patents are using narrower portions of existing knowledge.[2]

We then explored inspirations from different artists and came up with associations by analysing keywords in our initial statement.

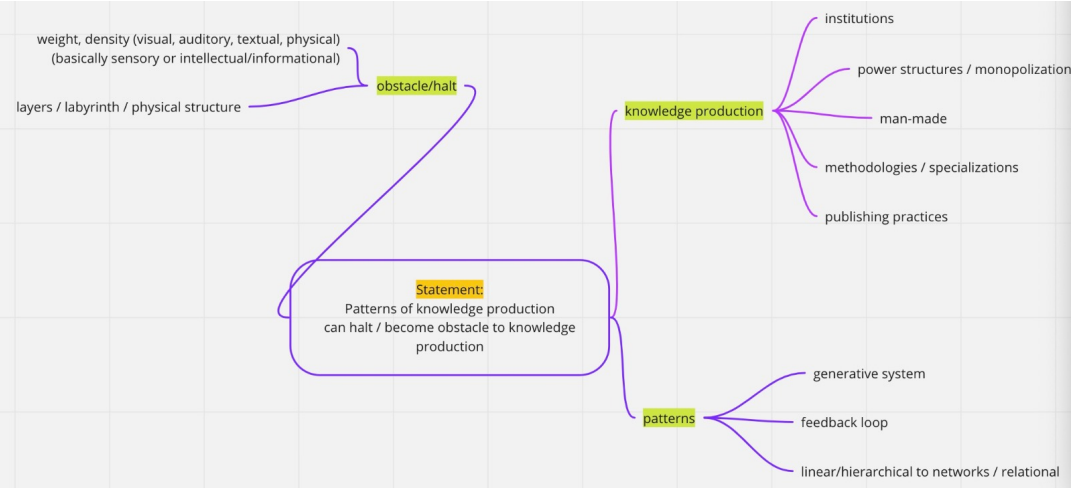
Examples of Inspirations

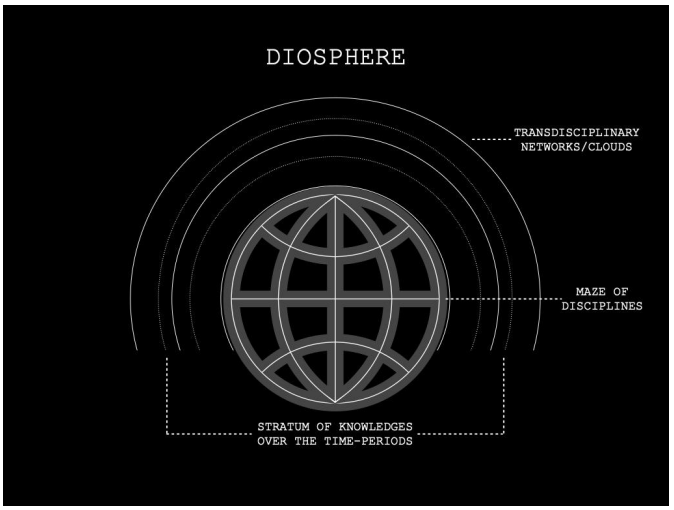


Katerina Petrovic's Lexicon Liber Novus and Neri Oxman's Krebs Cycle of Creativity

[2] Park, M., Leahey, E. & Funk, R.J. Papers and patents are becoming less disruptive over time. Nature 613, 138–144 (2023). https://doi.org/10.1038/s41586-022-05543-x

Our Interpretations





We summarised into the following aspects what we wished to incorporate into the experience:

- Physical structures: maze, pyramid and/or networks
- Algorithmic experience: Invite input from viewers and design the process of triggering output
- Design viewer interactions by mapping explicit/implicit rules onto their behaviours
- Visualisations of patterns

By building an interactive and immersive installation incorporating these elements, we aim to highlight the paradoxical nature of patterns in academic practices, and invite viewers to experience the importance of (un)learning patterns.

The Main Statement

From the original study, we extracted three ideas which can potentially be translated into an experience:

- A previous resource/pattern becomes a burden/block
- Rapid knowledge expansion becomes too fast that it reduces the effective stock of knowledge
- Increasing self-citations and reference to older sources

Therefore, we developed our main statement as:

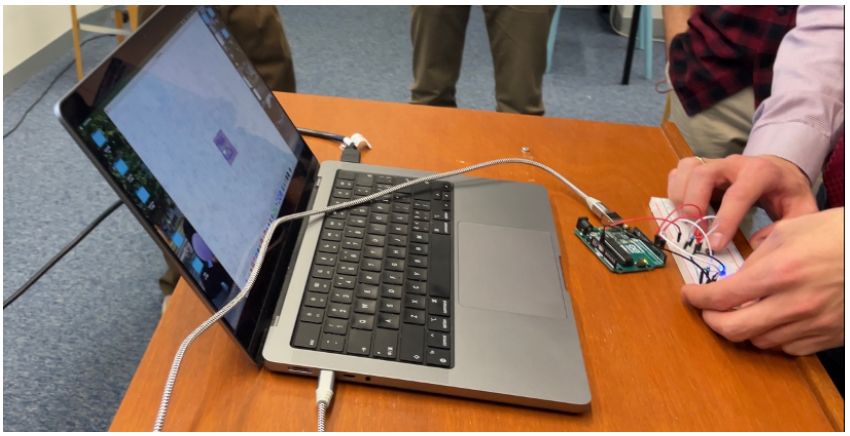
The more you know, the less you can know

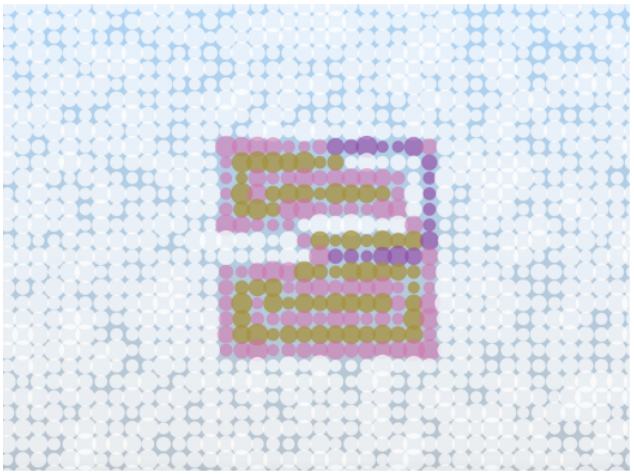
The scientific insight that inspired this work investigates the paradoxical nature of developing research practices as they aim to foster innovation, however in turn result in being stuck in a loop. The increasing specialisation in methodologies and methods used in academic practices results in a narrower range of knowledge utilised and thus over time less and less breakthroughs are taking place in the realm of emerging research practices.

The installation is a metaphorical materialisation of the previously illustrated pattern of research being a burden on the contemporary research practices, halting innovation and novelty. The interaction begins at the initiation of the visitor's arrival into the installation. As they manoeuvre around the curated space, they recognise that the pattern projected on the ground beneath is being formed depending on their movement in the space. Until, they arrive at a certain moment during their interaction with the installation in which they experience the moment of transition, a stage where they recognise that generation of the pattern is no longer dependent on their perceived or acquired rules of interaction with the installation.

Explanation of the Experience

We focused on the question of how to design guidelines for viewers' interaction and the process of triggering output through their input to be more interactive.





Our first prototype was inspired by an adapted reaction game. It was developed with Processing and Arduino, with every button press corresponds to a step in the pattern formation, and the only cue given to the audience is “Follow the lights and expand the pattern”. By following the LED cues and pressing the buttons accordingly, the pattern will keep generating based on a variation of Langton’s Ant rules. We received feedback on how to give the audience a more direct sense that their actions are meaningful, such as having a stronger sense of control or loss of control over the pattern generation.

Experience for the Installation/Materialisation of K(no)wledge Kaleido(scope)

Therefore, in our final work, the main viewer interaction is divided into three stages- acquiring, applying, and constraining, to allow the viewer to experience the idea of how a previous resource becomes a constraint.

- At stage one, viewers explore the space and learn the basic rules of controlling the buttons to make simple patterns (e.g coloring a 2x2 square) visualized through projection.

- At stage two, viewers can continue to apply the same control rules learned in stage one to create the pattern and achieve a slightly more difficult goal.

- At the third stage, viewers can still use the same control rules, but the logic of pattern generation is now built on a variation of Langton's Ant[3], which results in the effect of being trapped in the pattern, hence making it more difficult to have the control on the generation of the pattern. Additionally, there is also a possibility for the viewer to break the rules they learnt in previous stages.

Audiences who use the knowledge acquired in the previous level will find themselves unable to control the pattern generation. Although the pattern is constantly expanding, as the area increases, the speed of expansion will become slower and slower. It will go through more cycles within the square, therefore it will take more repetitive steps to expand one layer outward. This echoes one aspect of our statement: the number of breakthroughs decline as

[3] Langton’s Ant(RLLR) https://www.youtube.com/watch?v=NThVaH5PxmY

self-citation increases. However, it is possible for them not to follow the learned rules, and it will slightly speed up the pattern generation.

The audience has the option to stop when they feel satisfied or tired of the patterns that have been created. We then allow the player to print out a copy of the pattern they have generated in the game and attach a short paragraph providing the actual context of the game, i.e. declining disruptiveness in knowledge production. Throughout the exhibition period, we will also collect and post player-generated patterns around our exhibition area as a document and a demonstration of this experience, as the exhibition progresses, so does the installation.