

## Content of the tool:

Installation for Interconnected Thinking



# Installation for Interconnected Thinking

→ This three-dimensional installation of bamboo poles and strings invites people to explore the interconnections between two complex transformation processes and share their questions and ideas.



### The topic

You can choose your own two topics for the Installation for Interconnected Thinking. We recommend choosing two big transformation processes that can be broken down into multiple smaller topics (“trends”): For example, the changing world of work encompasses new types of jobs and the Fourth Industrial Revolution. Sustainability encompasses changes in mobility, energy sources and diet. As only a small amount of text is used to present the trends, it is best to use key words that require little detailed explanation.

### The Xtopian moment

Transformation processes are complex, particularly when they interact with each other. Amid so many topics to think about for the future, the installation can help people explore how two big trends interact. Visitors can physically place their own thoughts on the connecting lines between the two trends. This allows them to get to grips with individual interrelationships – visualised in the installation as connecting strings – without losing sight of the whole.

### The target groups

Depending on where it is placed, the installation is aimed at adult passers-by or at attendees of major events such as exhibitions or conferences. The event does not necessarily have to relate to the topic of the installation.



Time required	Group size	Format	Location	Materials
<b>Set-up after initial construction:</b> 30 mins  <b>Duration of exhibit:</b> any  <b>Dismantling:</b> 20 mins	<b>At any one time:</b> individuals or very small groups  <b>Overall:</b> unlimited	Individual conversations, individual time for thinking and writing	An environment where people can talk in depth; indoors or outdoors	Assembly instructions, installation, clips, cards and pens, weights if necessary to protect from the wind



## The educational goals

The Installation for Interconnected Thinking helps people systematically connect future trends – both independently and through exploring the contributions of others. It combines the individual contributions (which are hung on a connecting line joining two trends) in a participatory process to create a structured overall picture. The educational goal is to combine creative thought with systems thinking. You can support this individually by allowing visitors to ask you open questions as they study the installation.

## Application

**Preparing the topics:** Make the topics of the installation as compact but appealing as possible. Choose two topic areas and assign 3 to 5 trends to each topic (for example, if the topic is the future of work: AI in management, ageing workforce, human-robot interaction). Introduce each trend with a keyword and, if possible, a descriptive image.

**Construction:** The Installation for Interconnected Thinking is a tetrahedron made from six bamboo poles. The trends of two topic areas are aligned on two poles on opposite sides, the other four stabilize a network of strings representing the interconnections. A string net is suspended between the trends to connect the topic areas (e.g. nine connections for three trends, 16 for four; details in the assembly instructions). It takes some time and finesse to set the installation up for the first time, but it is well worthwhile, particularly if you plan to use it on multiple occasions. The installation folds away for easy transport and is extremely lightweight.

**Execution:** The installation serves as a talking point. You should therefore install it somewhere passers-by can see it clearly and pause to look at it. Brief the individuals who will be supervising the installation so that they can answer questions about the idea behind the structure. They should be able to use the Socratic method (open, reflective, probing and clarifying questions) to help visitors formulate their thoughts and engage in systems thinking. You may want to give them an overview of the thoughts of previous participants. Have pens and cards ready to record the participants' ideas.

**Evaluation:** If you want to make use of the results of the installation, you can transfer them to a matrix containing the two trends. For a more in-depth interpretation (e.g. through qualitative content analysis), the two reference points (trends) must be written on each card. The person supervising the installation may also keep an observation sheet recording their interactions with visitors. This means that you can also record the responses of people who did not hang their contributions on the installation itself.

## Potential and challenges

The size and unusual geometric shape make the installation an eye-catching addition to a public space. The simple materials and avoidance of long explanatory texts create a playful atmosphere that invites people to engage with complex questions about the future. Not every conversation will be recorded on a card. Some conversations may be deep and time-consuming. The more complex the topic, the more preparation required by the people supervising the installation.

**Source:** Jossin, J., Voigt, A., Godlewsky, T., Beecroft, R., Arnold, M., Bernstein, F., Messerschmidt, S., Rothfuss, D., Multhaup, S., Olshausen, I., Aweh, M., Lafratta, M. & Amrehn, U. (2023). *Toolbox for Xtopias: New tools for futurists*. kassel university press. doi:10.17170/kobra-202312089182

**We would like to thank:** The Visionautik Akademie for their advice, the Robert Bosch Stiftung for the funding.

**More info:** See [xtopien.org/outputs](https://xtopien.org/outputs) for a description of how the installation was used in Karlsruhe.

The "Urban Xtopias" project was sponsored by the Robert Bosch Stiftung.

**More tools and materials:** [xtopien.org/toolbox](https://xtopien.org/toolbox)

[xtopien.org](https://xtopien.org)



## Instructions for assembling the Installation for Interconnected Thinking

The installation is a tetrahedron made from six bamboo poles: one horizontal pole above the floor, one horizontal pole at the top edge, and four diagonal poles that connect the ends of the horizontal poles.

**You can also find an assembly video on our website [xtopien.org/toolbox](http://xtopien.org/toolbox). Have fun assembling!**

**Bars / bamboo poles**

- 1 Upper crossbar
- 2 Two diagonal rods with 3-5 nodes each
- 3 Two diagonal poles without junctions
- 4 Lower crossbar (shortened)

**Signs and cards**

- Title label
- Two topic cards
- 6-10 trend cards

**Cords for constructions**

- a) Permanent knots between the diagonal poles (short)
- b) Detachable knots at the corners to attach the crossbars (short)
- c) 3 to 5 connecting cords between the knot points (several metres each depending on the overall size)

**Detachable auxiliary cords**

- d) Auxiliary cord for the title plate (short)
- e) Four auxiliary cords for the theme and trend cards (2-2.5 metres)
- f) Auxiliary cords for weights (2-3m)

Construction sketch of the Installation for Interconnected Thinking

### Moderation material:

- A title sign showing the installation's name, e.g. „Installation for Interconnected Thinking“ or similar, approx. 15 cm by 100 cm
- 2 topic signs for the transformation processes, with a brief explanation of the topic on the back if necessary (A3, folded lengthways, laminated if necessary)
- 6 to 10 trend cards (A3, folded lengthways, laminated if necessary)
- A5 cards or moderation cards
- Marker pens
- Small foldback clips
- A small surface for people to rest on as they write the cards (e.g. bistro table)
- Observation form to record interactions (optional)

### Construction material:

- 5 bamboo poles approx. 200-250 cm Ø 15 mm,
- 1 bamboo pole approx. 160-210 cm Ø 15 mm
- 100 m of string for tents (or similar)
- Adhesive putty and rough string
- 10 clothes pegs

### Aids for transport and installation:

- Fabric remnant for easier transport, ideal 1x2m
- 2 sandbags or stones to protect from the wind (optional)
- Depending on where you will place the installation, use weatherproof materials



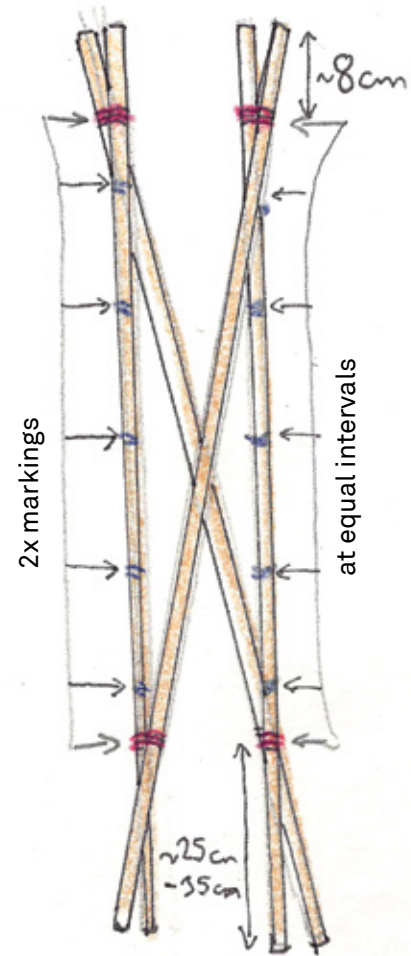
**Set-up:**

1 If necessary, shorten the bottom horizontal pole by 40 cm.

2 Discretely mark two of the four diagonal poles, e.g. with a pencil: 10 cm from the top (=thinner) end, 30 cm from the bottom, and then, depending on the number of trends, 3-5 markings at equal intervals between the top and bottom markings.

3 Connect the four diagonal poles at the outer pencil marks. Two at the bottom end and the other combination at the top end (see illustration on the right).

- The knots must be absolutely secure on the bamboo, but must keep some space between the poles and allow some play (see illustrations below).
- If the knots do not hold firmly enough on the poles: Wrap a ring of adhesive putty around the pole and knot three turns of very rough string tightly over it. Cut the ends short. You can now attach the other knots over this layer.



Movable knot for the diagonal poles



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**Temporarily assemble the poles as a tetrahedron**  
(not on a very slippery floor).

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**Attach the top horizontal pole:**

- a. Place it on the top two intersections so that it protrudes by around 25 cm on each side (see markings).
- b. Secure it with a strong knot where the upright poles intersect. Use a knot you can untie for transport but that is strong enough (e.g. loop the string around the poles several times) to keep all the connecting lines in the installation taut, see photo.
- c. Place the shorter, bottom pole on the lower intersections of the diagonal bars; it should only protrude a few centimetres. Attach it in the same way as the top pole so that it is easily detachable.



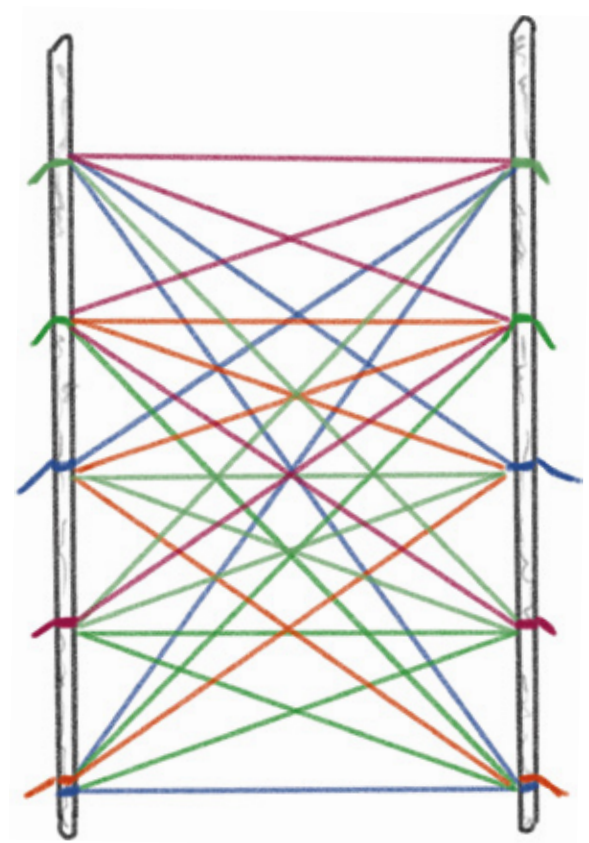
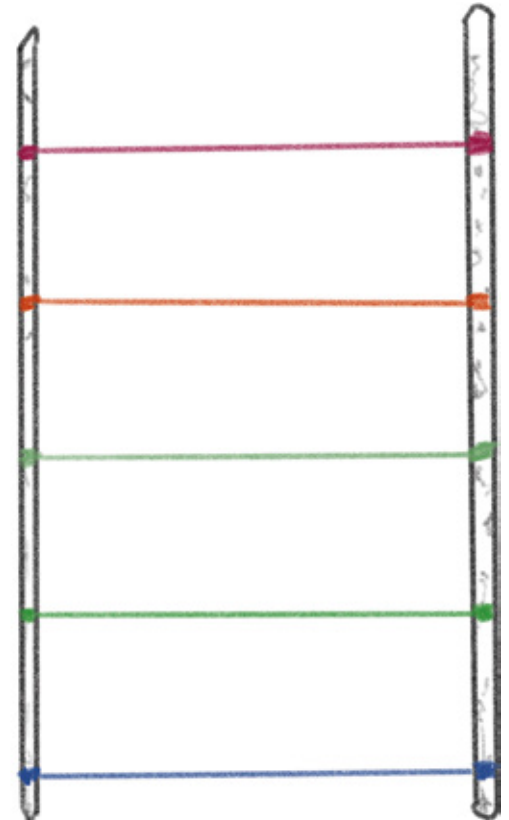
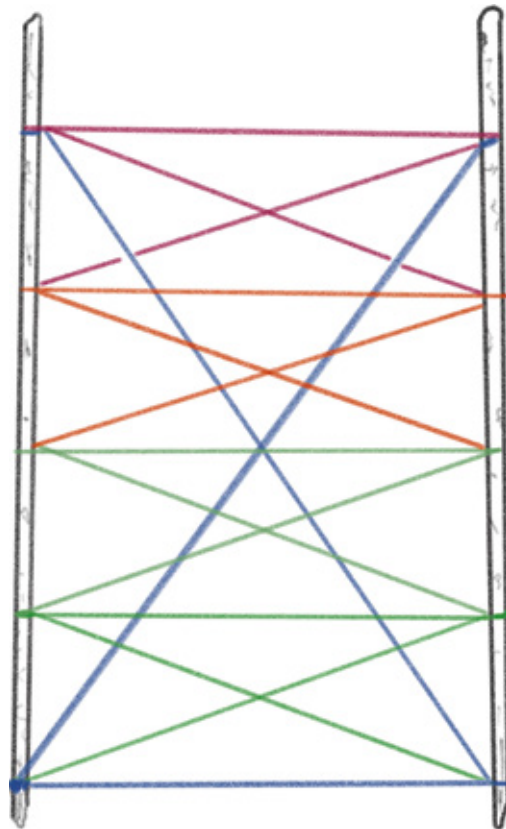
*Positioning and knotting the top horizontal pole*



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**Estimate the lengths of the connecting strings:**

- a. To estimate the correct length it is worth drawing a sketch showing the nodes on each side (image). You should leave at least 40 cm of string spare at each node so you can tie the knots and attach the topic card.
- b. The strings should not have more than 4-6 nodes to keep the strings easy to adjust.
- c. Number of strings = number of nodes on one pole (3-5).
- d. Length: 3 or 5 strings measuring 1.8 m cord + 1 m extra for the ends and loops.



Sketches for bracing, example with 5 nodes and 5 horizontal strings each



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**Provisionally tensioning of the strings**, which serve as connecting lines:

- a. Choose two diagonal strings opposite of each other (front left, back right). Attach a ring of adhesive putty to each of the pencil lines and tie them very tightly with three turns of rough string. Cut the ends of the string short. These fixed points will become the nodes.
- b. Connect the lowest nodes of both poles with a string. The middle of the string (mark this with a foldback clip) should be in the middle of the bracing, the cord should only be gently tensioned.
- c. Then connect the second lowest nodes and so on up to the top ones in the same way.
- d. Loop the ends of the strings around the bamboo pole and fasten them temporarily with a clothes peg.
- e. Then tighten the other diagonal connections of the nodes according to the line drawing and stabilise the strings at each node with clothes pegs behind the poles.



*Intermediate position during tensioning: Clothes pegs hold the strings in position.*

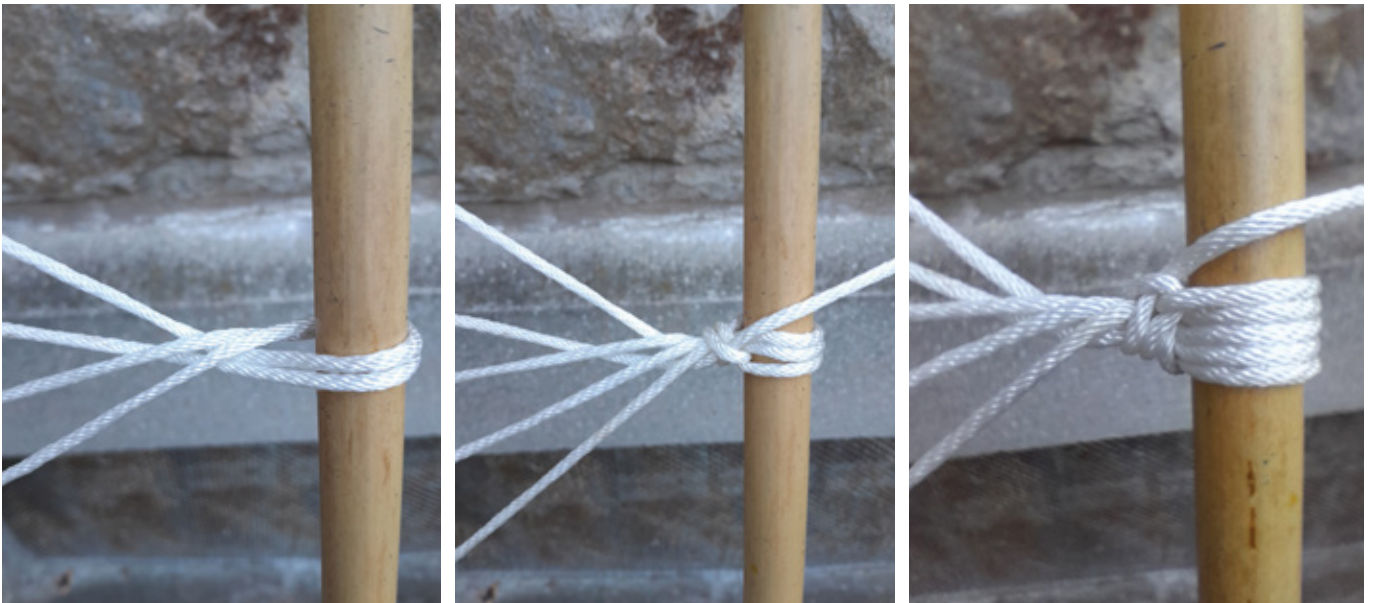




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**Finalising the strings:**

- a. Only when you have provisionally tensioned all the strings do you equalise the tension of the cords. The level of tension itself is not important (this can be adjusted later using the upper and lower pole). However, all strings should be evenly tensioned.
- b. At each node, at least one string will have enough extra length. Use this to tie all strings together securely so that they cannot slip down the bamboo. It is important to achieve a “tidy” knot, as visitors’ eyeline will be drawn to these points.
- c. If individual string ends are still protruding, you can now cut these and, if necessary, prevent them from fraying (e.g. by melting the end of the string).



*The strings at a node are firmly connected to each other and to the pole with the string end.*



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**Attaching auxiliary strings** (these are fully removed for transport):

- a. To hang the trends where they will be clearly visible, now tie strings running parallel to the two poles with knots from the upper horizontal pole to one of the lower ends of the slanted poles. One runs close to the slanted pole, one from the end of the upper horizontal pole to the lower end of the slanted pole.
- b. You should attach these strings with strong knots that can easily be untied again.
- c. If you are placing the installation where there is a risk of wind, you can use the two upper corners of the tetrahedron to tie it to weights or fixed points (e.g. railings). The installation is much more stable than it appears.
- d. In busy environments, you can also attach a weight to the lower horizontal pole. This improves stability without creating a tripping hazard.

**Disassembling for transport:**

- a. Remove the signs and clips.
- b. Untie the auxiliary strings. You may want to clip them together with a label. The connection strings remain on the poles.
- c. Remove the horizontal poles.
- d. Fold the upright poles together so that they do not become entangled with the connection strings.
- e. Wrap all the poles in a sheet or similar and tie the bundle together with one of the auxiliary strings for safe transport.

*Auxiliary strings for the title, the topic cards and the wind fastening*





**Set-up at the installation location:**

- a. Depending on how busy or windy the site is, you may want to first set the installation up in a quieter/more sheltered place nearby. The tetrahedron is extremely easy to transport, even by one person, but is too large for most doors.
- b. Lay out all the materials, separate the auxiliary strings from the strings you will use to tie the horizontal poles together.
- c. Put up the tetrahedron and untangle the strings if necessary. Check that all the knots are still firmly tied.
- d. Position the upper and lower horizontal poles and secure them (use knots you can untie again!) so that all connecting strings are under slight tension.
- e. Adjust the knots if the tension is uneven. The bamboo poles should not visibly bend.
- f. Attach all the auxiliary strings. Use knots you can untie again.
- g. You can attach the sign containing the name of the installation to the upper horizontal pole using two short strings and clips at the ends or with a zigzag string with several clips.
- h. Use foldback clips to attach the two topic headings to the top of the auxiliary strings.
- i. Also use foldback clips to attach the trend cards to the nodes. Tie the trend cards to the leftover string at the nodes.
- j. Finally, place the installation so it can be seen clearly from all sides (if possible, a surface area of 9 square metres for easy walking around).
- k. Attach guy lines and weights if necessary.
- l. Place a bistro table with cards, pens and (optionally) the observation form next to the installation.
- m. So that the installation is not completely empty at the beginning, you can write some cards yourself and hang these up. You can then remove these later.





**Application example: The Installation for Interconnected Thinking in use**

As part of two multi-day science communication events organised by the Karlsruhe Institute of Technology (KIT), we set up the installation in a public square in the city. The aim was to invite passers-by to talk about how the various necessary sustainability transformations interact with the changes in modern working environments. To address such „dry“ topics, an inviting, lively and interactive installation is exactly the right door opener.

