

The following definitions come from the Cambridge Dictionary:

To tinker means “to make small changes to something, especially in an attempt to repair or improve it”

I don't think this definition completely overlaps with the definition given in the course. Tinkering can also mean creating something new by trying out a new concept.

Trial and error is “a way of achieving an aim or solving a problem by trying a number of different methods and learning from the mistakes that you make”

Brainstorming is “an activity or business method in which a group of people meet to suggest a lot of new ideas for possible development”. It can also be described as:
“to try to solve a problem or come up with new ideas”.

Tinkering involves hands-on experimentation and iterative modification. It is about playing around with something to repair or improve it. But it's also possible to create something new through tinkering. The process of tinkering often involves trial and error as it is not always clear what the solution should be. Compared to trial and error, tinkering involves educated guesses given the information you are presented with. Various solutions exist and by learning from mistakes and refining approaches a nice product can be made.

Brainstorming is about creating new ideas. This is often also required for tinkering.

ChatGPT-4o gave as definitions: “Tinkering is an informal, hands-on, and often unstructured process of experimenting with things to understand how they work or to make small improvements. It typically involves making incremental adjustments without a clear end goal in mind.”

“Trial-and-error is a systematic or repetitive approach to problem-solving where multiple attempts are made to find a solution. If an attempt fails, adjustments are made, and a new attempt is made until success is achieved.”

And lastly, “Brainstorming is a creative thinking process where individuals or groups generate a wide range of ideas to solve a problem or develop new concepts. It emphasizes free thinking, avoiding judgment, and encouraging diverse perspectives.”

I-tech projects vary from health care robots to interactive led lights. Some technical hurdles could be the amount of interactivity with the system, through user engagement or adaptive feedback. A ‘playful’ approach such as gamification serves as an excellent approach to tackle such problems as this can increase the interest in the design. Factors such as sensor accuracy, latency, and performance do not allow for such a ‘playful’ approach in tackling them. While some tinkering with the settings might be helpful, these are mostly hurdles that require structured problem-solving.

For more tinkerspiration, you could visit a physical lab, such as the design lab that we have at the UT. Hackathons, Tech conferences can introduce you to the latest tech and inspire your inner tinkerer. Lastly, art and science exhibitions or museums (such as the dutch “de ontdekhoek”) can provide cool ideas to play with.

Online resources could include Hackaday, various YouTube channels featuring DIY & Tech experiments (such as Stuff made here or Mark Rober), subReddits featuring Tech, and various research blogs. Personally, I enjoy watching some videos of the mentioned youtubers, but they have not yet convinced me to tinker around myself. As described earlier however, I have tinkered with programming a solution/optimal strategy for a game, when the internet did not provide me with one.

In the first iteration of this document I mentioned that I don't think there are untinkerable domains. After that I went to the lecture and heard about examples like jobs at a nuclear power plant or a brain surgeon. I agree that certain high risk domains have a reduced tinkerability. I can see how in a field where mistakes are dangerous, tinkering around with such a 'serious' business might not be the best option.

Nevertheless, I think every domain can use some sort of hands-on creative approach. For some domains where safety is important, this might be limited to a design/ideation phase. A nuclear powerplant worker could create a floor map of the terrain and a brain surgeon could create a dummy brain to practice with. You could argue that in some cases you slightly change the field/domain by going to a design phase. But I would argue that it is part of the bigger scope/field.

I think some ideal spaces for tinkering are during a prototyping, design, or ideation phase. Tinkering can be used to somewhat quickly put a thought into practice. I think that teaching children stuff through tinkering is one of the best use-cases of tinkering. But also, adults can still greatly learn from this. Trying out things to attempt to make something work. Examples of this could include choosing which voice to choose for a healthcare robot. It's difficult to create and evaluate the impact of different voices. A domain like sports can benefit from tinkering through the tinkering with all the different sensors. Music benefits from tinkering as artists/producers try out new things in an attempt to create something beautiful. Smart environments and smart products benefit from tinkering as multiple designs and combinations are possible. Tinkering often relies on trial-and-error. This can be a limitation. For instance, as solutions might work on a small scale, but fail when they are scaled up. In some fields, failure is not an option. Tinkering cannot always provide the necessary reliability or accountability.