

# Possession Tool: Design Preferable Future with Humane Assistant and Diegetic Prototype

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This paper presents a design tool to support future-oriented design of humanized product or service. With the development of technologies such as artificial intelligence (AI), people are increasingly eager for the active and emotional products and services. In order to add social and human features to the future goods, we try to generate a design approach based on the theory of design fiction, which can predict the preferable future, and back to the present to develop the current prototype. This new approach was used to empower student's creativity in design research project and practical courses, and it also iterated and refined through the feedback of students.

This paper proposes a design approach, namely Possession Tool, which focuses on the ideation process, including four stages, i.e., decomposing the problem, envisioning humane assistant to solve the problem, extracting the humane assistant features into a diegetic prototype, and transforming the diegetic prototype into a realistic solution. And a four-staged modular tool sheet has been built for the further research. The Possession Tool emphasizes reflection on the design output to ensure that the future development meets the designers expect. With the support of the tool, young designers can expand their creative thinking, re-establish relationship between the present and the future, and design the present by imagining the future.

In the field of design research and education, this paper contributes an approach that focuses on social and cultural perspective of product and service. It is hoped that this kind of experiment can open up a new field of design humanized artefact to speculatively building the preferable future.

**Keywords:** *Possession tool; design tool; design fiction; diegetic prototype;*

## Demand for a tool to create humanized products

As the products become more intelligent, people have put forward further requirements for designing humanized products. The traditional design regards things as objects, media, the extension of human beings, which are lifeless and passive, executing the designed program to serve people. In recent years, with the matureness of intelligence technologies, people begin to dialogue with things directly, instead of looking them as the media between humans. For us, future is the time to symbiosis with intelligent artificialities. There will be more interaction between human and machine on function and emotional level. As a result, things are going to be human partners, which provides new space for design. We can design

intelligent partners without hardware, focusing on their software, the world view, the character, and the way of completing tasks. If we look the software and hardware of machines as the spirit and flesh of lives, we used to pay more attention the flesh, but now we can design the spirit.

On the other hand, for the learning ability of machines is getting stronger, they can output design schemes by inputting excellent design samples. To some extent, the work of functional design will transfer to machines from designers, and the original field of human designers will be captured. As a response, designers will lay emphasis on mining opportunities at the social and human fields. Designing emotionalization and humanization products is on the way.

*Table 1 The functional product and the humanized product*

	<b>The functional product</b>	<b>The humanized product</b>
<b>Background</b>	Industrialization, informatization	Intellectualization
<b>Field</b>	The fiction of science	The fiction of society
<b>Characteristics</b>	Passive	Active
<b>Essence</b>	Medium	Noumenon
<b>Manifestation</b>	Functional, useful	Emotional, humanized

We want to build a tool that can be applied universally to the creation of humanized products. The tool will clarify the process of generating ideas. With this tool, not only designers, but also innovators of other disciplines can imagine products for the future. At the same time, we hope that this tool can be used both to envision the future, and to solve existing problems.

### **Method of generating new design tool**

With the requirement of creating humane products, we turned to literature analysis for existing methods and tools which can stimulate humanized and social thinking on future products. In the literature of Design Fiction, we found the convergence of the concept with us, that is, to discover the preferable future through the product. We first set the tool with a working principle, to design future for good. But different from laying eyes on the discovery and speculation of problems advocated by Design Fiction, we hope the tool can solve problems to improve the present situation.

Then, by the method of Research through design, we gradually completed the tool through one research project and two courses. In each project or course, we collected feedbacks from tool users through questionnaires and interviews, and iterated the tool with the important revision suggestions. It can be said that the Possession tool is an approach that has grown up in the practical application of the project and courses. After two iterations, a procedural, modular tool has been formed. At the same time, we sought the company as a partner to ensure the design is connected to the real application.

*Table 2 The experiment of research project/course and the development of Possession tool*

<b>Name of research project/course</b>	<b>Characteristics of project/course</b>	<b>User of the tool</b>	<b>The development of Possession Tool</b>
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<b>Experiment 1</b>	AI city	Master student research project Non-directional	Design background graduate student	Forming basic process
<b>Experiment 2</b>	Future retail	Cooperative courses with company JD directional	Design background undergraduate student	Adding humanized features
<b>Experiment 3</b>	Future life	2-week concentrated development course directional	Multi-background undergraduate student	Completing modular tool

In the study of Ai city in Experiment 1, the tool was still in its infancy. The users of the tools were graduate students with the interactive design background. Through the experiment in this research project, the tool has determined the basic idea of searching the solution in the hypothetical future and then returning the solution to reality. In the interactive design course of Experiment 2, the entire process of the tool has been basically confirmed, forming a process of ideation by decomposing the problem, envisioning humane assistant to solve the problem, extracting the humane assistant features into a diegetic prototype, and transforming the diegetic prototype into a realistic solution. In the Experiment 3 Future Life, a design and the technology entrepreneurship laboratory course, the form of a modular tool has been finally generated through the verification by multi-background students. With the reference to the Design Fiction concept, and the practice of Research Through Design in research project and courses, a tool has appeared for promoting humanized product design.

### **From design fiction, to Possession Tool**

Design fiction is a concept created by science fiction author Bruce Sterling, to suspend suspicion of change by intentionally use story prototypes. Anthony Dunne and Fiona Raby developed the concept, focusing on the speculative nature of the design, and reducing the “guessing” component of the fiction, which magnifies the impact of the product from a critical perspective. It implements a “prefigurative criticism” strategy that presents future possibilities to the audience and allows the audience to make choices. Just as Anthony's value proposition for Design fiction, our expectations for the new tool is to help people discover and identify the future they want. But at the same time, we also hope that the tool can give feedback to the present on the basis of speculation, and stimulate designers to influence the future by changing from now. If Design fiction is the radar scanning the future, we want to design a tool by which the feedback signal can be responded.

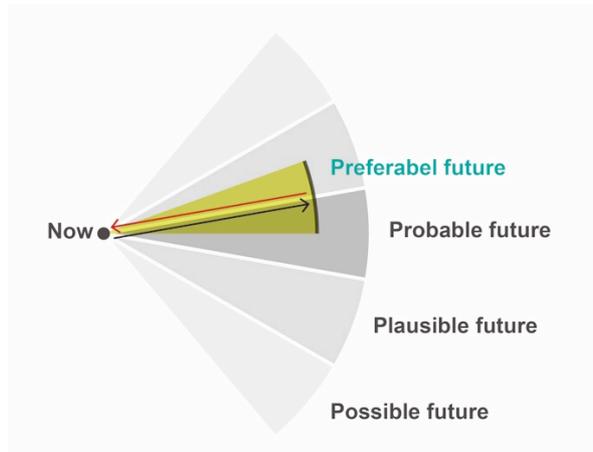


Figure 1. The radar of Design Fiction and the evolution by Possession Tool

In terms of controlling the humanized characteristics of the design results, we envision the ultimate intelligence of the product, which will eventually think like a human being, like a spirit. There are many similar myths and legends in China and the West, such as the spirit of wood and stone named Chimei in The Analects of Confucius, the magic mirror in Snow White, and so on. These legends are imagining the maximization of the objects' function, that they can do something by themselves and even with their unique way, so they are humanoid. Moreover, these super-energy objects have emotions, and hold their own principles of life. For example, Chimei like to live in the mountains, the magic mirror is quite stubborn. Meanwhile, their character features will also be reflected in their actual functions and images. It is the object that we want to create by controlling the design process with the design tool. Therefore, at the beginning of innovation with the tool, we set up a humane assistant, and it (Use it to refer not because it is an object, but because we are not sure what the gender it is) can solve the problem. By this, the way to solve the problem will be inherently humanized.

Next, by narrative way, the characteristics of the humane assistant will be shown in a designed object which is called the Diegetic prototype. The Diegetic prototype is derived from the science fiction movies, and is often used to display the possibilities of future technology through the design of objects. Here we can look it as a prototype that can express ideas. Diegetic prototype is suitable for describing the characteristics and usage of a future product through a story. It can be rough to leave room for imagination. With the diegetic prototype, innovators can express the concept of the solution which have the characteristics of the humane assistant. In other words, we can extract the spirit of humane assistant and inject it into the diegetic prototype. This process is much like the plot of spirit possession in stories, so we named this tool Possession Tool.

Combined with the above, we list several important keywords in the development of the concept of the tool, the preferable future, the humane assistant, and the diegetic prototype. By materializing these keywords with the design tool, we designed the main content and core process. Experimented in research and education, finally the Possession Tool has been iterated into a modular sheet.

## Possession Tool

The Possession Tool is an approach for design ideation. It helps to export humane products to achieve the preferable future by seeking the solution of the existing problem in a future scene and bring the solution back to the reality. The approach divides the process of ideation into four stages, decomposing the problem, envisioning humane assistant to solve the problem, extracting the humane assistant features into a diegetic prototype, and transforming the diegetic prototype into a realistic solution. The approach emphasizes solving problems through a humane role, and then injects the role's characteristics and its method of solution into prototype to create a humanized product.

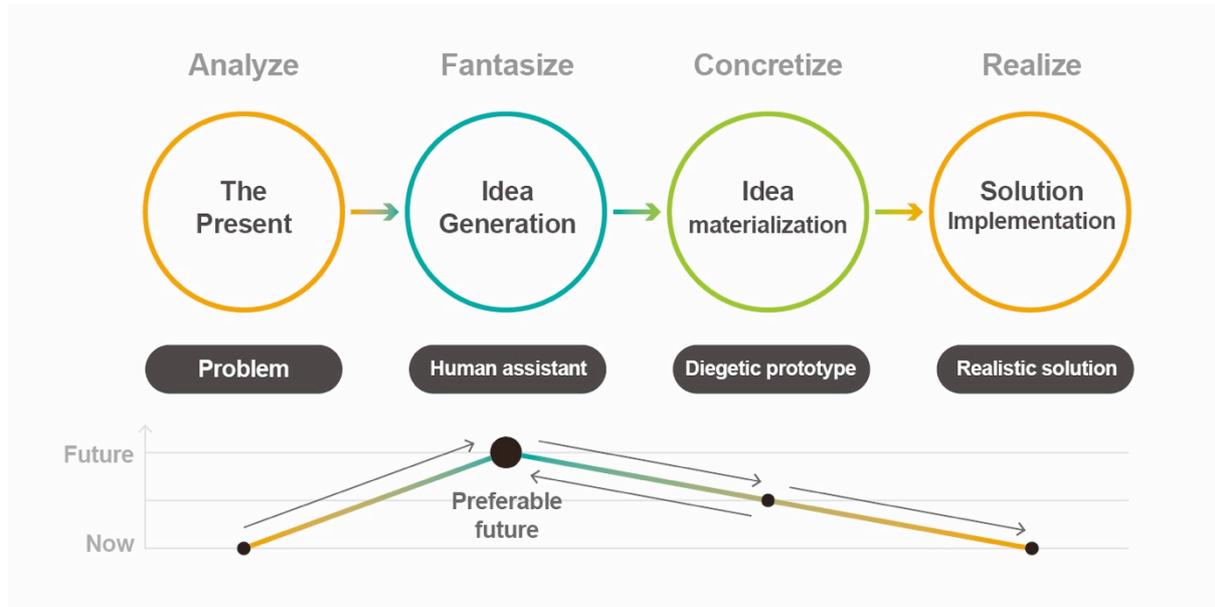


Figure 2. The stages of Possession Tool

The Possession tool pushes the search of solution into an extreme condition, exploring for broader ideas with fewer constraints, and then incorporating social, economic, and technical contexts into considerations, to bring out ideas with realistic considerations. In this way, we can envision the preferable future in the early stage of design. In the middle and later stage, we will check the conformance between the future we want and the future design product brings. By this way, the speculative factors will be throughout the overall process of idea creating.

Meanwhile, for the requirement of emotional products, we have introduced the role of humane assistant as a medium to solve problems. In the current design process, we often consider the hard support part before the soft support part, which makes products cold and inactive. We hope to reverse this order. While taking the function design into account, the spirit of the product can be considered as well. Or even the characteristics of the spirit go prioritized. When envisioning the future, innovators are asked to solve problems through roles that have human characteristics. The humanized role can be a super-smart creature or robot, such as Superman and Doraemon, or a sophisticated animal or item, such as Nekomata in Japanese mythology. They must have their own principles of behaviour and unique problem-solving techniques, which will be concretized as a diegetic prototype, to form the characteristics of the product.

On the final stage, the approach of Possession Tool guides designers to turn the diegetic prototype into a ground-breaking solution with the existing technologies. If the technology develops smoothly, the realistic solution will likely grow into the humane assistant we have envisioned.

Above, we realized the creation process with visible Possession Tool sheet. Corresponding to the four stages of the approach, the tool sheet includes four modules, the problem, the humane assistant, the diegetic prototype and the realistic solution. In the diegetic prototype module, we have left a space for reflecting the use of the diegetic prototype, on fields of social, economic, technical, and so on. The tool sheet can drive users into fully understand on each design stage and the design goal. It is more conducive to the ideation and reflection of ideas than linear step-by-step guidance.

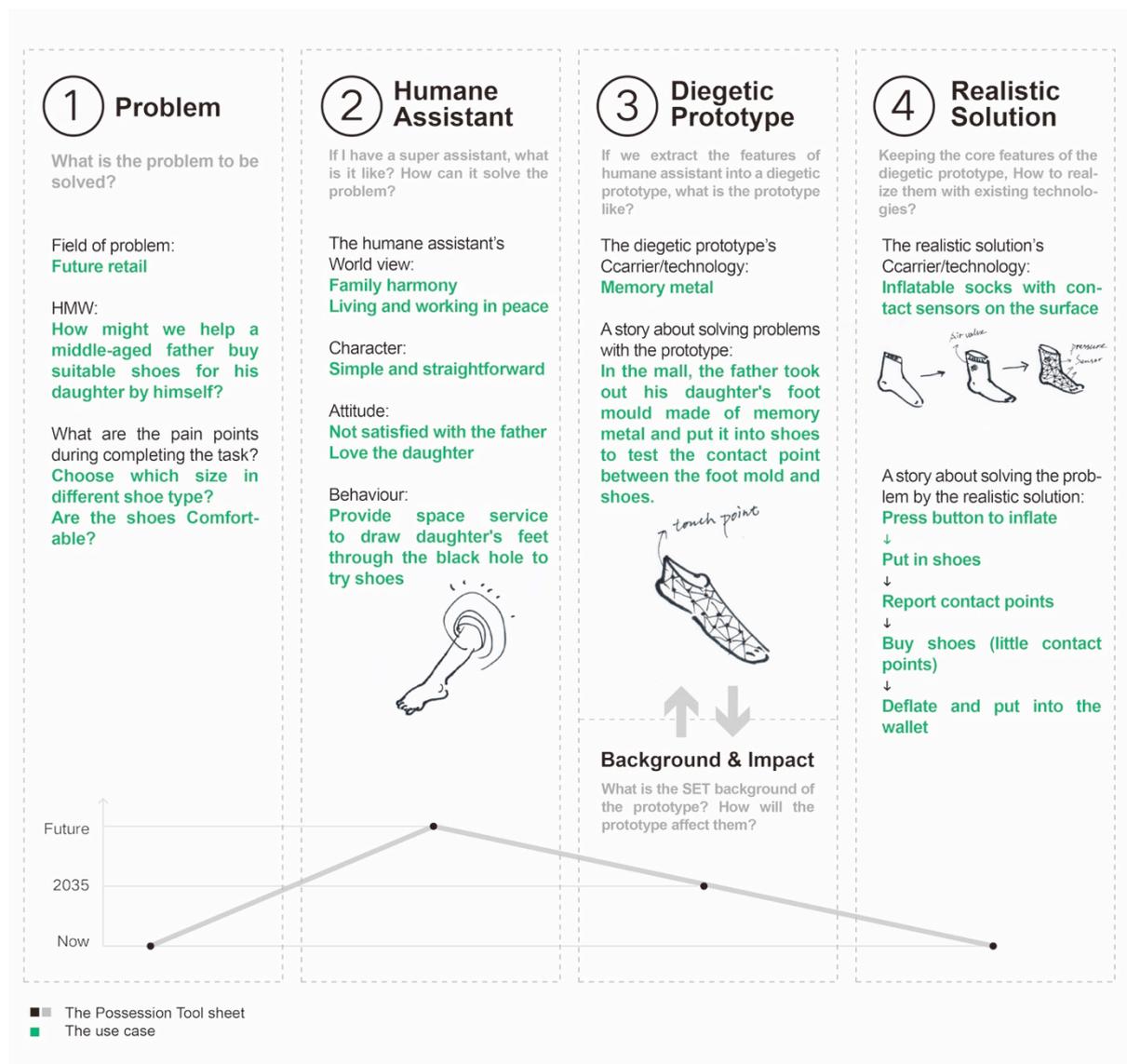


Figure 3. The Possession Tool sheet and use case

According to the process showed by Possession Tool sheet, product designers can smoothly design fiction and achieve the process of ideation. In addition to the modular stages, the tool sheet also provides a reference to the time axis to remind the user to pay attention to the background context when brainstorming. In actual use, the conventional

approach is to deduct from the Problem in numerical order, but when it's blocked with thinking, the creator can break the order to rethink and reverse, so as to ensure the activeness of the process and the innovation of solution.



Figure 4. The scene of using Possession Tool

### Decomposing the problem

As the beginning of ideation, we must first determine what the problem is to be solved. The problem is not an abstract phenomenon, but a most painful point for a specific person in completing a particular task. Since we are not the user, we usually cannot pick up the problem directly, so we use the step-by-step approach to dig out it.

Table 3 The process of decomposing the problem

	Process	Tools	Purpose
<b>Coarse</b>	Field of problem	Territory map, AEIOU	Circle the scope of the research
<b>Middle</b>	Task to be completed	How might we (HMW)	Guide the actual research
<b>Fine</b>	The pain point of the task	Persona, Empathy map, Journey map, Stakeholder	Discover the problem that can be turned into

As shown in the use case of Possession Tool sheet, in the field of retail scenarios, the task is to help a middle-aged father buy a pair of suitable shoes for his daughter by himself. Through research, we found that the most painful point for is the inability to determine the accuracy of the size and the uncertainty of the comfortableness due to different shoe types. These will be the findings to be turned into design in the next step. Then, we are going to imagine a humane character with special abilities to solve the problem in its unique way.

### Go to the future: envisioning humane assistant to solve the problem

Based on the consideration of the humane characteristics of the product, after obtaining the pain points that the user wants to improve, we suggest the creator envision a humane

assistant with personality to solve the problem in a unique way. The point is, the way must be preferable to all beings of the future. When envisioning the humane assistant, the creator can be as bold as possible for a distant future. It can be a intelligent creature of any kind with powerful capabilities to help you achieve your goals. But at the same time, it is limited by its own characteristics. Just as a person's way of solving problems is limited by his world view, personality, attitude and his own basic conditions, we also designed these features for the humane assistant to make it seem human. These humanized settings will evolve into personalized problem solutions.

*Table 4 The characteristics of humane assistant*

<b>Characteristic</b>	<b>Content</b>	<b>Purpose</b>
World view	What does the future assistant think of the world? Usually similar to the preferable future set by the creator	Ensure the final product leads to preferable future
Character	What is the inherent personality? Lively, steady, agile, delayed...	Affect product characteristics
Attitude	Attitudes and opinions on the problem to be solved	Affect the way a product solves the problem
Behaviour	Way of solving the problem	Determine the way a product solves the problem

Setting the assistant's worldview helps the creator choose the preferable future. Creators need to be clear that all products will have an impact on the development of society. The maximization of this impact should be benign, in line with what creators and the public expect.

The setting of the humane assistant character can provide designers with a basic reference for product characteristics. William Odom of Simon Fraser University in Canada participated in the design of a game called Slow Game which draws on the practice of playing Chess. The spirit of this game has a stable character, a complete chronic. When embodied the spirit in a specific function, the design only allows the user to play one move every day. Odom hopes that the personality of the game will make the user feel "slow life", only participate in a little bit each day, but participate for a long time.

The attitude of the humane assistant to the problem will affect its behaviour, that is, the method that the product present to solve the problem. In the case of the father choosing shoes for her daughter, we set a special attitude for the future space assistant. The space assistant is not completely positive about the father, which stems from the family relationship hidden behind the task. For the father has been not well involved in the growth of the daughter (a common problem in China's social, most of fathers tend to focus more on career), the assistant looks not very active for the father. But, it likes the daughter very much, so it chose to provide space service to draw daughter's feet through the black hole, to try shoes. It hopes that the daughter can be happy by feeling her father's heart, instead of taking a more convenient approach by directly matching the feet data model of the daughter and the scan model of shoes. After completing the task, the space assistant also has his own "selfishness", which expects the product derived from it to become a carry-on item to remind the father to pay attention to the family.

Before the future assistants had features, the solution was divergent, but afterwards they are contracted and concentrated. In the following, only by injecting these features into the prototype, it is possible to produce a functional thing with emotion and attitude.

### **Extracting the humane assistant features into a diegetic prototype**

In this stage, we begin to materialize the ideation of humane assistant into a diegetic prototype. In the conversion, we do not have to retain all the characteristics of the character, only the important part that has a decisive influence on the product characteristics. After materialization, we must reflect on the reaction of the product (on social, economic, technical, etc.). The designer should specifically examine the variants of the prototype in the next 2, 5, 10, 20 or even further years. The impact of using it on the future should eventually evolve into the preferable one we have chosen. In the impact of the deduction, we can use the Future Board tool to mark the development of the product on the given time axis, as well as the positive and negative effects on society, economy, technology, etc., as a reference to the value and necessity of the design.

*Table 5 The process form humane assistant to diegetic prototype*

<b>Step</b>	<b>Content</b>	<b>Operation</b>
1	Highlight key point of humane assistant characteristics	Select parts of humane assistant characteristics to be converted
2	Choose a point-in-time of future	The background of the era determines the level of technology that can be used
3	Selection carrier/technology	Choose carriers or technologies that properly represent future assistant features
4	Tell a story about solving problems with the prototype	Design an prototype with humane assistant features and describe how to solve the problem with it
5	Rethinking the impact of the prototype	Deriving the long-term impact of the product with the future board

In the case of the father choosing shoes for his daughter, we have identified some key attributes of the space assistant: moving the feet, sensing the contact between shoes and feet, and as the father's belongings. We chose 2035 as the time background of materialization. The reason for determining 2035 as the background of imagination is that it will not be unpredictable for the development of technology for it is too far away, and it will provide a 15-year period of scientific and technological developing, leaving us room for future design. In the consideration of the carrier, we have selected the memory metal to introduce the characteristics of the space assistant. This material has some obvious advantages, can be deformed, can record the shape, and can be electrically conductive as a metal. These features can be concatenated with the characteristics of the humane assistant, to form a diegetic prototype that can be transformed into a daughter's foot and can detect the contacts with shoes. Meanwhile, when it is folded, it can be placed in the wallet like an Omamori. The Omamori is a kind of amulet in Japanese culture that can be carried, like which, the folded memory metal foot mould will also remind the father to pay attention to the family and guard the family happiness.

From the humane assistant to the diegetic prototype, the process of soul possession is completed. This is the core part of Possession Tool.

### Back to the reality: transforming the diegetic prototype into a realistic solution

After we have a solution in the form of things, the next step is to land it as a prototype that can be presented in the real world to respond to the questions asked in the first stage. When designing the realistic prototype, it must be noted that it is able to inherit all the important features of the diegetic prototype, that is, the character, attitude, and behavioural characteristics of the humane assistant, to ensure the continuity of ideation thinking.

Once the shape of the realistic solution is determined, the creators can demonstrate its service flow through a variety of design tools, and express the usage scenarios, usage methods, usage results and impacts of the solution in a narrative manner. At this point, we used the Possession Tool to help complete the entire ideation process.

*Table 6 The process form the diegetic prototype to a realistic solution*

Step	Process	Content	Tool
1	Find alternative materials/techniques	Find existing materials/technologies that can inherit the characteristics of diegetic prototype	
2	Design realistic prototype	Use existing materials/technical simulation solutions	Wizard of Oz
3	Use tools to describe realistic solutions	(product name) provided (product or service) with (feature highlights) to help (target user) solve (problem description)	Persona, Storyboard, Tomorrow headlines, Concept video
4	Display service	World view, operational rules, relationship diagram	Journey map, Experience of the ring

In the case of buying shoes for the daughter, we finally converted the foot mould made of memory metal into inflatable socks with pressure sensors on the surface. The transformed solution can be used in existing laboratory conditions to express the core concepts of design. Inflatable socks can simulate the shape of the foot and report the contact with the shoe by pressure sensors. At the same time, when the sock is deflated, it can be folded very small and placed in the father's wallet. Moving the feet, sensing the contact between shoes and feet, and as the father's belongings, the realistic grass model as a variant of the diegetic prototype, also continues the important features of the humane assistant.

From decomposing the problem, envisioning humane assistant to solve the problem, extracting the humane assistant features into a diegetic prototype, to transforming the diegetic prototype into a realistic solution, the Possession Tool is unconstrained on ideation by imagining in the future scene and then draw the solution back to the existing conditions. The tool helps creators to achieve the idea in a broader context. At the same time, the tool introduced a humane role in the earlier creative stage targeting the problem, ensuring the humanized factors of the subsequent prototype, so that creators can integrate the world view and the future expectations into the product. In the design, to produce things with more emotional characteristics.

## Feedback and reflection

After the one and a half year experiment, the Possession Tool has been used in three courses to help students advance the process of ideation. In fact, this tool has been developed in the validation and feedback of these courses.

*Table 7 The development of Possession Tool*

Course	The version of tool	Imagining in the future	Humane assistant	Drawing the solution to reality	Feedback of creators
1 AI CITY	Conversion between the future and reality in process (step-by-step)	√		√	The tool can help divergent ideas, but lacks uniqueness The outputs lack features
2 Future retail	Add humane assistant into imagining (step-by-step)	√	√	√	It's better to show the entire process, in order to master the staged goals
3 Future life	modular Possession Tool sheet	√	√	√	The tool can help design humanized products/services more effectively

For the purpose of creating a preferable future, Possession Tool was originally designed to help design future-oriented products or services. It has initially had the current process, to directly imagine a prototype in future to solve existing problems and then land it in reality, but lacks the setting of the humane assistant. After the verification of research AI CITY, we analysed the design direction of future products. Compared with machines, human designers are better at bringing emotional characteristics to products from the perspective of society and humanities. Therefore, we have added the role of humanoids into the approach (the development of technologies such as AI also provides the possibility of realization of this kind of imagination). In the second tool application of course Future Retail, Possession Tool continues the initial step-by-step approach to help creators with ideation. Users of this course have given important feedback suggestions, and hope to know the full picture of the tool in advance before using the it, to help master the stage goals and rethink across stages. As a result, the Possession Tool eventually grew into a modular tool sheet with four step-by-step stages.

*Table 8 The evaluation of Possession Tool (PT) users*

Course/Research	AI CITY	FUTURE RETAIL	FUTURE LIFE
Total number of student	8	16	22
Willing to use PT again	6 students	12 students	20 students
Got unexpected results with using tools	7 students	9 students	20 students
Recognized PT to help develop ideas	7 students	13 students	20 students

Thought there was a gap between method and practice	2 students	6 students	5 students
Main help for design thinking	Helps jump the thinking restrictions	Helps generate interesting and unexpected ideas Helps build critical thinking ability	Helps stimulate creativity within the group Combining characteristics of humane assistant with reality, the solution becomes special
Main help for design process	Helps determine design positioning Helps develop prototype	Helps express design concepts Helps list and sort out design ideas Helps concrete function and image of design	Helps divergent creative thinking Helps locate design scenarios Helps improve functions

Before ending the three research/courses, we issued a questionnaire to each student to know how the Possession Tool was used. We are gratified that Most users expressed their appreciation for this method and would continue using it in future designs. Moreover, respondents generally indicated that the Possession Tool method helped users develop critical thinking, jump out of thinking constraints, and create unique solutions. In the design process, it could help show design concepts, determine design positioning, and benefit prototype expression. Especially when the tool with four steps is integrated into paper sheet, it is more helpful for ideation than step-by-step procedural guidance.

In addition, on the innovation of the course results, we also interviewed the designers of corporate partner 7 Fresh offline store of JD (China's self-operated e-commerce). They showed their appreciation for the family and social relations mining in student works, and the way how to embed the relations into products and services, calling the results a new perspective of thinking independent from commercial design.

However, the design approach formed in this study has only experimented in the teaching and research of the college, so until now its application groups and scenarios have limitations. It is hoped that the tool could be tested in more practical projects in later research. In addition, there is a lack of long-term validation and feedback on the generation and use of tools. From the original intention of the tool design, we expect that the creators' ability and quality can be separated, that is, with the help of tools, non-design background creator can obtain design ability, and reach a certain level of design. As far as the observation of the use of Possession Tool, in fact, the background and quality of a tool user limit the use of tool. Design tools can help design advance, but they cannot substitute human thinking.

The next step of the study is going to collect the content filled out by users, analyse their thinking space and thinking mode, and the creative distribution characteristics, to promote the designer's comprehensive thinking. Another development direction of the research is to establish an related database to provide intelligent tips and help for tool users, and to help creators including designers and non-designers to ideate smoothly.

## Conclusion

This research establishes an ideation approach from a humanized perspective. It helps innovators design present through exploring a preferable future. The rapid development of intelligent technologies enhances the active, emotional and humanized features of product. Smart technology will replace designers in functional design, and designers will play very important role in the field of humanized design. Under such a trend, this study attempts to set up a tool that adapts to the humane product creative process. The tool helps the innovators to draw a humanized solution by decomposing the problem, envisioning humane assistant to solve the problem, extracting the humane assistant features into a diegetic prototype, and transforming the diegetic prototype into a realistic solution.

In the paper, the Possession Tool was applied in the context of design for future. We conducted research and teaching experiments, which obtained good feedback from students and industry experts. There is a saying in Chinese that give a man a fish and you feed him for a day, teach a man to fish and you feed him for a lifetime. Design tools empower people the abilities to innovate, thus it has been becoming an important research direction and field in the future. It is hoped that this approach will provide a practical path in the application of new technologies for innovative design activities, and can inspire future-oriented, humanized and speculative tool development and form new research field. It is expected that more innovators can grasp the future-oriented design trends and produce more humanized results.

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