

ORIGINAL RESEARCH ARTICLE

Gesture recognition for engaging spatial experiences in healthcare:
Co-design of intelligent interactive illuminative textiles

Supplementary File

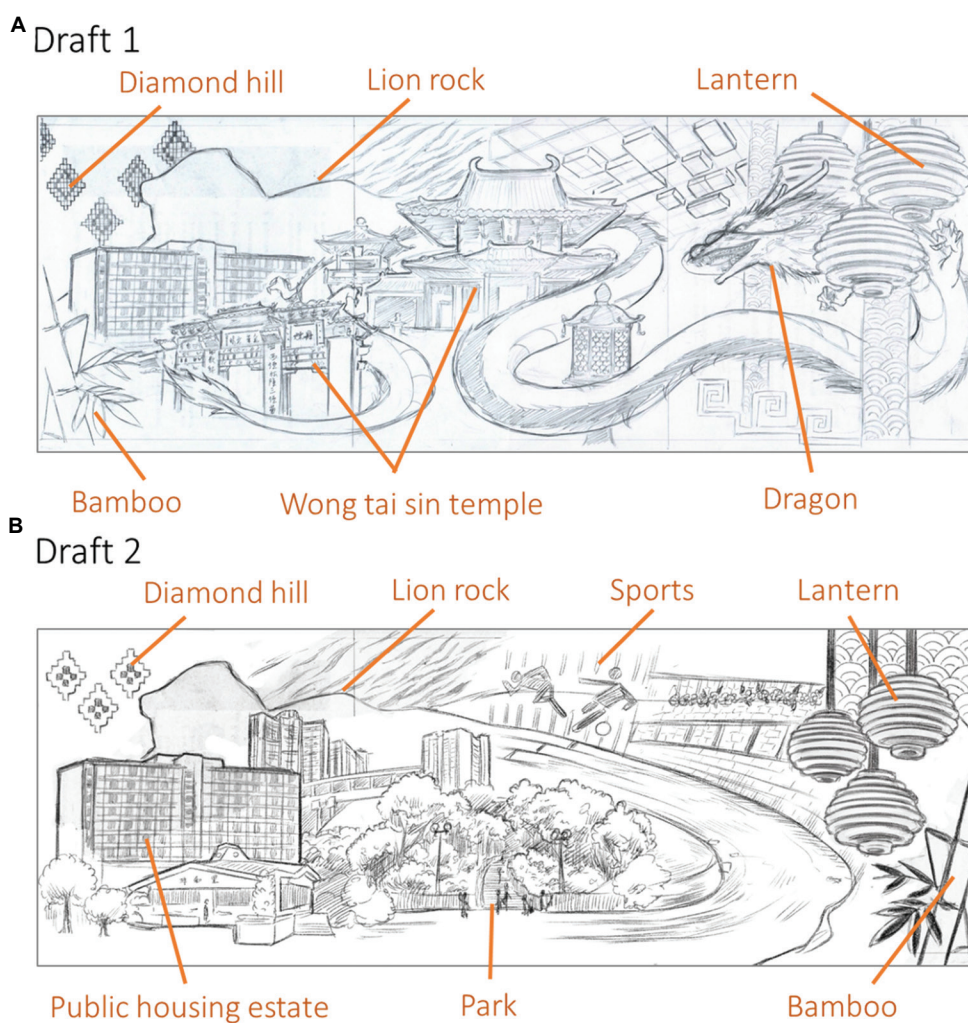


Figure S1. Conceptual drafts of textile wall panel designs inspired by iconic landmarks in the Wong Tai Sin district, Hong Kong. (A) Draft 1 and (B) Draft 2 showcase the illustration and design of wall panels featuring several landmarks from the Wong Tai Sin district.



Figure S2. Four color palette options, each composed of three yarn colors, proposed for the fabric knitting process

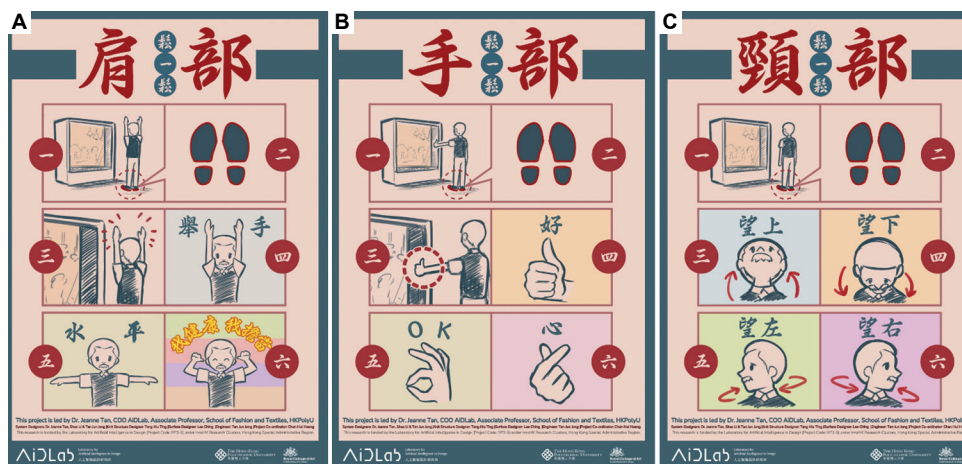


Figure S3. Infographic illustrating interaction with the illuminative fabric wall panels through (A) shoulder, (B) hand, and (C) head movements

Table S1. Co-design session: An interview transcript

Time	Content (extraction)
38:25	Sensory visual effects: Even if someone takes care of you, but with lights and colors, pressing to turn on the light will help you know from the color that it's the bathroom or other household items.
40:15	Continuously lit/illuminated.
40:21	Add a pattern: Lion Rock represents the region, I can identify it myself, and I am very impressed. Popular patterns.
40:54	Simple sounds, e.g., the sound of running water, such as a bathroom, or the management pool, such as going home.
41:18	Simple things, let them associate them, and they can recognize them faster by looking at pictures than by reading words.
41:30	Different sounds according to different positions, not necessarily gestures.
41:52	Press it, find it fun. Game elements, attract the elderly should be "interesting," not preachy or rational.
42:20	Must be relaxing, soft music.
42:46	Lion Rock plus Lion Pavilion, waiting, plus flowers and green grass. Eye-catching red, yellow, and colorful. It will be visually comfortable.
43:25	The usual treatment is to remember the past, remember the past, which is helpful to the condition.
44:18	Relax, relax; hard objects will make you nervous. Bird sounds, water sounds, and moving objects.
44:31	Hard objects are not good, as they will make you nervous. Touch and hearing, flow and sound have a strong response.

Table S2. Research lead interview transcript

Time	Content
Q:	So, can you tell us a bit about this project and about the background of your innovation?
A: (00:35)	Right, the background of this project is actually based on my new invention called Intelligent Textiles. It is actually a gesture recognition textile based on computer vision and polymeric optical fibers.
Q:	So, the same question. Can you tell us a bit about this project?
A: (01:22)	Alright, this project today, we're going to show the application within the context of rehabilitation. It is based on my new invention, AI textiles...
A (01:38)	AI textiles, which are based on gesture recognition and also on computer vision, and polymeric optical fiber textiles, which illuminate. We are using it within the context of rehabilitation because it can be used as a contactless interactive textile panel, and usually it is used for multi-sensory stimulation, which is often used for people with dementia, people with learning challenges, or even for the general public, just for multi-sensory exercises.
Q:	Can you tell us? Why do we need to use multi-sensory stimulation tools to treat or respond to these illnesses?
A: (02:23)	Actually, multi-sensory stimulation is a very commonplace kind of activity for people with dementia and people with learning challenges, or even the general public, because a lot of times they need stimulation of their different senses, for example, sight, sound, tactile, touch, things like that. So, this actually encourages them to engage more with the external world and also encourages more communication. And so, this is actually used as a supplementary kind of exercise for many of these people.
Q:	What is the innovation or novelty of using intelligent textiles as a multi-sensory tool?
A: (03:22)	The main innovation here is that, actually, there are many multi-sensory tools available from industry suppliers, but you'll find that many of them are actually made from everyday products. So, they actually could be made from metal, plastics, and actually, they do not encourage people to go and touch them or interact in a closer manner.
A: (03:49)	So, the great thing about our intelligent textiles is that it is a textile, right? So, you can actually put it around, you can touch it, and it doesn't emit any heat. And you can also interact with it because we use AI. So, they can actually interact with it in a contactless manner. Hence, both ways they can use it, either contactlessly or they can actually touch it.
A: (04:15)	So, for us, they can have immediate feedback. So, they can give them a gesture, a control gesture, and then it will actually change colors, it will change the illumination, and it is immediate. So, for many of the existing items that are available for multi-sensory tools, you'll find that again, they may have on/off switches, they may be interactive too, but maybe they wouldn't have a soft texture as a textile.
Q	Why do you think that there is a certain advantage, or what do you think is special about the fact that textile is soft or is tactile, that would benefit this purpose? Specifically.
A: (05:08)	The advantage of having a textile within this kind of context is that you know how textiles are omnipresent in everyday life. So, people are going to see that, hey, even without its function. It's a piece of fabric, so they are not going to be resistant to the material or the technology. They are more likely to be able to engage with it.
Q	So, it seems that another way to put it is that it blends really well with the environments, and also it encourages or allows people to really be receptive, or to be comfortable around it, or to even interact with them.
A: (05:50)	And another one of the great advantages about our team with AI textiles is that we have the know-how of knitting these fabrics with industrial machines, and we also have the specialty that we can actually knit them according to whichever patterns that we want, whichever textures that we want.
A: (06:15)	So, we can actually co-design our intelligent textiles with our users because the belief of our team is that our designs and our products should accommodate the needs of the users instead of the other way around. So, for example, if you look at the panels that we have installed here at the healthcare center, you'll see that the surface patterns are actually based on the important landmarks of this neighborhood. And this is actually based in Wong Tai Sin.
A: (06:45)	And Wong Tai Sin is a very important neighborhood in Hong Kong. It has a lot of history and cultural elements, and many of the residents of this area are very proud that they are connected with this neighborhood. So, they have actually co-designed the panels with us, and they wanted us to include the key landmarks of this neighborhood so that they are more likely to want to come and engage with them.
A: (07:14)	And the other great thing about this panel is that we can also customize the gestures. This center actually has got their own slogan. So, their slogan actually involves my health, my responsibility, and they actually have a hand gesture that goes with this.
A: (07:34)	So, we actually design one of our interactions to have a reaction. So, if the user is to use this gesture in front of the panel, it will actually give a very interesting illumination effect. So, then they will know that they have successfully engaged with the panel. So, this is a great little exercise for their multi-sensory stimulation.
Q	It seems that what you said about engaging with stakeholders, the users, is exactly what you have done here, right? For this project with the Wong Tai Sin rehabilitation center, can you just maybe tell us a little bit about the background of that, like how that happened?

(Cont'd...)

Table S2. (Continued)

Time	Content
A: (08:14)	We were very, very lucky. The reason why we had this collaboration is because of...
A: (08:37)	So, basically, we see that the collaboration with Wong Tai Sin is that we were very fortunate that we share the common vision of wanting to create products, new products that will actually help users. So, they were preparing to renovate their new center at Wong Tai Sin. And they know that I have a new invention, and perhaps they can commission me to install something so that it's a new product, a new tool, so that their users of this center can actually interact with the newest technology.
A: (09:13)	So, this is how the collaboration first came about, and because they were so supportive of research and development, they have arranged for us to be able to co-design with their team. So, the team would include their management staff, their healthcare providers, and also the users. So, we all were able to sit down together and look at the materials that they like, the colors that they would like to use, the functions that they would like to incorporate, so that they can actually encourage the users to engage with multi-sensory stimulation.
Q:	OK. I think we talked about what the current limitations of multi-sensory tools are. So, we talked about that. We talked about why the intelligent textile is important for the application. But I don't think we talked about why it's the next trend. I'm just curious in terms of whether you are going to improve this, right? I'm also curious just how much room this product or this innovation has for future improvement. What's your vision for? What do you want to get better at this? Will it get better? Things like that. Well, what other products do you think you can apply to? That will be interesting.
A: (10:43)	I think the trend for this is because I think intelligent textile has got the potential to be applied for many, many different contexts within our rehabilitation, because it's a textile. There's something that is very easy and simple. We can even put it as part of the upholstery or furniture. We can make it into portable products like cushions, so that they can interact with it in a different way.
A: (11:10)	So basically, I think there is a major trend going in that direction. And it is also as we get older as a society, our people who are technology savvy are getting older too. So, they will be expecting that we want to have products that meet our needs. They also want products that include technology.
Q	Did you talk about, like, what other product do you think you can apply it to? ... I wonder if there are any more specific details that were given. For example, who suggested this? Who suggested the landmark? Them? Did we get special, specific artists? ... So can I say, so that social worker. So, she knew about this technology, and she came up with the idea of why don't we combine the two?
A: (13:20)	I propose that, because the last time I also did a co-design process, I found that it was successful, because people will feel that I'm not just buying a product from the shop.
A: (13:46)	...So, then that's how I do the engagement, and also I think for the therapist, they also find it very challenging. As part of their work, they have to constantly find new things that engage their users. So then, if we do the co-design, they also feel more engaged. So, can you see that it's kind of like a reverse marketing tool, to show their own staff that they care, that they will go and do R&D with a university...
A: (14:50)	We had co-design with them, so-called right, and it is also used as reverse marketing to show that...
Q	I'm just guessing. I don't know when you sort of came up with this technology. Because you're in the field of fashion, first of all. So, I would have assumed that your initial thinking was about the application of the system. So, it must have been quite surprising for you to think about to know that there is this dimension completely out of my...
A: (16:00)	The reason why we came up with this AI textile, this contactless version, was because I was engaged by a new world to go and install a panel in Zhuhai, and I was having yum cha with their healthcare management, who was also a social worker.
A: (16:27)	And then they came up with something because we were like, ohh yes, let's do the embroidery. You know, like fashion and textiles people, and my team at the time was all good, and we're like, yeah, ohh someone. Right. And then they said that the elderly.
A: (16:45)	They have dementia. They may want to pick it and eat it. But at that time, we registered that and we're like, oh, it would be nice to do something that is contactless, but at that time, there was pre-COVID and pre-research funding. So, we just kept that in mind. So, once we had that research funding, we knew the capabilities of this technology. We design a contactless version.
A: (17:12)	So then we know that people can interact without textiles. And as we were designing it, we realized that, hey, you know how during COVID everybody has become really lazy and we just want to sit on our sofa and watch Netflix? Wouldn't it be great if we could use this technology? And they raised their hand and changed the signal, and they changed the color of the illumination. And because everybody's always at home now, OK, but the space is very limited. So let's say a brother comes into this room and they say I want a blue room and then after that, somebody else uses this room and I want a purple room. They can change it, and it's immediate feedback. So that was the story. The long-winded story.
Q:	That's interesting. I think just a final question, and I think we're about to go into the talking about separately the co-creation process of the panels, right, right, design process. So why don't you tell us a little bit about the design process with the panels?
A: (18:10)	The main design process for these panels is that we already have that technology, we already know how to make the textile, and we already know about the technology. So we wanted to talk with our stakeholders, we wanted to co-design with them to make sure that the functions and the overall esthetics of it fit in with their space, and we want it to be non-obtrusive.

(Cont'd...)

Table S2. (Continued)

Time	Content
A: (18:33)	We understand that whatever we install into a space, it's a privilege. We want to make sure that it doesn't stand out obtrusively so that it blends in. So, if people do not want to interact with it directly, it still has a particular function over there. It still serves as a panel. But if they want to interact with it, the technology is there with them. So, we actually were able to engage with the healthcare centers' management, their therapists, and their users.
A: (19:05)	So, we actually come down with several sessions whereby we talk about their color preference, their gesture preference, their material preference, etc., and come up with the designs. And the great and very distinct thing about this particular center again is that the users here are very proud that they belong to such a distinctive neighborhood. So, they wanted us to design something with the key landmarks of this neighborhood.
A: (19:34)	So, we were able to do that because we have the know-how to be able to knit such complex patterns onto the panel, too. So, it is not just about integrating the technology, but also involving esthetic considerations when we are designing.
Q:	Tell us a bit more about the co-design process.
A: (21:13)	Well, during the co-design process, we were also able to discuss the gestures that they would need for these panels because many of the users, even though this healthcare center actually caters to a wide range of users, many of them are actually the more elderly residents of this neighborhood. So, sometimes they may have some early mobility issues, especially with their hand gestures. It might not be able to have the most accurate gesture.
A: (21:44)	So, we were also able to select the gestures that they think will be popular with them. You know, for example, things that they find easy and use in everyday life, like a "Good." And there is always one that's a favorite, which is the heart shape, because many of them watch a lot of TV series, and then the heart shape is always very popular in a lot of TV series.
A: (22:06)	And the other design element that we were able to collaborate on is, of course, the surface design of the panels. And one of the most distinctive landmarks is actually the Lion Rock. The Lion Rock is actually a very important symbol of Hong Kong, too. And the residents here are also very proud that they can see Lion Rock every day. So, this is a special request that they have requested for us to include in the surface design of the panels.
	I think that's everything from all the questions. I'm just wondering whether there are new projects for the technology since the last time we talked. Is there any new way you've got to describe technology? Then it seems like we have, I think. We can move on.

Abbreviations: AI: Artificial intelligence; R&D: Research and development.

Table S3. OT lead interview transcript

Time	Content
Q:	I know that you have this project in collaboration with AiDLab, and we're very curious to learn more about it. So, I think the first question we have is how the intelligent textiles have contributed to the multi-sensory experience of the users in your center?
A: (01:00)	Actually, this is integrated in the theme wall, which is where we put that in the waiting area, and inside that are many of the icons of the local district, Wong Tai Sin. So, it cultivates a very warm atmosphere and also has a strong sense of belonging.
A: (01:25)	Members coming, coming here and waiting for the service they can look at the beautiful design and also they can stop by and also remind them to move a bit, exercise a bit and also have some interaction with the theme wall to have some gesture and then the lights of the intelligent AI fabric will have the different colors and that's very interesting.
A: (01:56)	So that the AI wall also has some, which makes the process very interesting and also cultivates them to have you can move a bit, exercise more, and also you can have fun, while you're waiting.
Q:	I think we can also talk a bit more about how the embroidery and invitation work, or whether you tend to invite the users or the visitors to move around. But I think that would be my 4 th question because I'm very curious about that. But I think first of all, I think we can retake that because we just want, maybe, potentially more material. So let me just ask you again. So, how are intelligent design and intelligent textiles contributing to the multi-sensory experience at your center?
A: (02:56)	Actually, we can have the design in the waiting area, and in the waiting area, we have some demos and also a poster to show to the members how to use them when our members are waiting for the services. They wait there and also sort of posters and then know that how to use it and then they can move with the gesture and then there's some different colors and it's an interactive multi-sensory experience and it is not only remind them to move a bit, exercise more and also have more interaction and interaction also interact with the people, the different members sitting around because they can also watch the multi-sensory experience and that is fun for the members using the AI wall and also for the members sitting around.
Q	It is important for visitors at your center to move around, right?
A: (04:03)	Yes, because we are a District Health Center and we want them to have a preventive side to have some exercise habits and also maybe a healthy diet, but also moving is having more exercise is a very good way to have good health and also prevent more diseases, so this is a very important element.

(Cont'd...)

Table S3. (Continued)

Time	Content
Q	So, do you think that the way the color changes or the way that the AI wall stimulates the senses is a good way or a very particular effective way to stimulate or to interact with the users?
A: (04:51)	Actually, when I first approached Dr. Jeanne Tan, I approached her for the sensory that is touching because we have some different designs in other centers that are touch, and then there are different sensory experiences. Now there is COVID, so touching is maybe having some infectious control measures, so we don't need to touch, and also just some gestures, just far away can have some color changes that are very interesting, and also comply with the infectious control.
Q	What are the main benefits of using this new material in the rehab context? So, in the rehab context... The next one is actually very interesting to think about what you think or how you think the tool; this one is different than those in the market right now.
A: (06:06)	I think this is very unique because you can have a unique design, and also that we can have a unique design for the fabric, and also this one is that we can interact, and also we can integrate this into a theme wall, and also it also has some exercise inside that.
Q:	I'd like you to repeat. Maybe in the first sentence, you can say this design is very unique. You said this is very unique, which is enough. But I think if you can emphasize that this design is unique and I think it will be even more impactful. But I'm also curious because you have the user right there, the designer, there's a supplier of the technology, but you're the end user of this. So, I wonder from an end-user perspective. What kind of complaints do you have about the products on the market these days? Or what are the shortcomings, or what did you want to see that the markets are supplying, and then? What is it that you know AiDLabs or the textiles are offering that the market doesn't have that you did that makes you sort of feel that they're supplying or bridging a gap in these markets?
A: (07:25)	I think this design is unique, and I also think the only complaint is that we can only find Dr. Tan's team...
Q:	I mean the shortcomings of the products in the market right now. And so what is it that you think the textile or Dr. Tan's product is so great and sort of overcoming that gap in this case?
A: (07:57)	Actually, we don't have any others; this is brand new, right? So, I think we can't find other similar products just like this. I think this is a unique product that we can find in the market.
Q:	Great. So, let's rephrase that. So, I think maybe we can say this product, we think that this design is very unique, and then also maybe repeat the reasons why you think that this design is so unique. Why do you think that? What do you think this tool or this design is so different than those that are already in the market?
A: (08:40)	I think this design is very unique and it integrates what we want to put in the center, that is the district base, different icons such as the Lion Rock, something like that in the textile design, and it also has different interactive gestures that can be inside the different walls and from the market. I don't find another one that can just similar to this. So, I think this is very, very nice and very good.
Q:	From your observation, how do you think that this design has engaged with the users?
A: (09:30)	I think for this one, we have a long way to develop the design, and actually, I discussed with Dr Tan's team on the development of the design, and we engaged different users in the development. And Dr. Tan's team has also very thoughtful preparation for the user's workshop, and they bring a sample of the fabric, so that the user can touch it and learn more about the technology behind it. And then they contribute their ideas on what can be put on the design, and then after that, it really provides some ideas for Dr Tan's team to develop the design and put many of the elements inside. And this one makes the whole picture very unique, and also to us, it has a very strong sense of belonging.
Q:	And about the design's engagement with maybe the users at the centers or the visitors at the centers, maybe the elderly. So, what do you think about that?
A: (10:53)	I think before, in the development process, they contribute ideas, and then, after our service commencement, those users come and see the product. They were very excited that their contributions were included in the design in a beautiful way, and that is a way of engagement, and then for...
A: (11:20)	For the Lion Rock, we also discussed the "Chuk Yuen", which is the Bamboo garden, something like that, that can be inside the design, and they were very excited about that. And if for now, people come and they see all these familiar icons on the theme wall, and also have some interaction with different pictures like that. They were also very excited and felt that it was really in the Wong Tai Sin District.
Q:	When you say users, do you mean the elderly, or do you mean your team?
A: (12:05)	Our members range from six to the elderly, so different people can come here as members, so it is not only for the elderly.
Q:	Really interesting, so it sounds like it was a really community effort. So, it was not just the members of your team, but members of the center. When you said, because when you said the members' input, and then you thought that as staff members, I thought it was either staff members, members of the team, or members of the center, who were mostly elderly. But then, when I realized it was a much bigger community, which sounded even more interesting to me.

(Cont'd...)

Table S3. (Continued)

Time	Content
A: (12:53)	Yeah, actually, we started the development in our preparation period. At that time, we didn't have members, right? So, we have our local partners. We ask the partners to invite some of the members to come and because all those are our potential users and some, most of them, you can say they are adults or elderly people, but we plan to invite some teenagers, but that is something like school time, so no teenagers come but actually they most of them are adults and also elderly people, they contribute their ideas that what do they think in Wong Tai Sin is those icons and also brings you good sense of belonging.
Q:	And also, in your opinion, is there a need for intelligent materials for rehab purposes?
A: (13:59)	Yeah, I would say in intelligence, throughout the rehabilitation process, that is definitely yes, because we adopt different technology and also intelligence to enhance the effectiveness, efficiency, and also make the rehabilitation process more fun.
Q:	That's all the questions on the list. Anything else, you guys? ... It's the same thing just now, so maybe what do you think is the main? What are the advantages, benefits, or main effects of applying this AI wall at your center? So, I think that maybe what you can say is that it encourages users to be more active or interactive, to become more physically healthy. Hopefully. My second question is actually a bit more. I'll just probably ask you if you have any more examples of, or any daily observations of having installed the AI wall at your center. ... So, how have the users, any users, actual users, provided feedback? They say they. They really enjoy it, or did they say that it's fun? Or you actually see them interacting with the wall, and what do you mean? What does that mean to you? Anything like that, there's nothing of, you know, that you really want to mention, that's fine, but I'm here to just fish. So, I think that you just go with the first one. So again, Elsa, to continue from just now, can you tell us just a bit more about the effects? The advantages of having this AI wall at the center?
A: (16:38)	I think basically this is a beautiful design and it can give us some very warm atmosphere and also because there are different icons of the district, that is, people from the district, feel very a strong sense of belongings and also we can use that for the interactive multi-sensory experience and that is very nice because they can enjoy it and also keep moving and also we want them to keep more moving, exercise and something like that to have keep them healthy.
A: (17:19)	And then for the interaction, it not only bring fun to themselves at all, also has a very good interactive process with people sitting around because they also enjoy the process that they find that the people here is moving and also have some interaction and also have the multi-sensory experience and that's very nice and interesting and also can keep them have some social interaction.
Q:	I want to just do one more thing, try again. I think the bit where you elaborate on what you encourage us to do. I think maybe we can clarify. It will be quite enough if we just say, well, we think it's amazing that this AI wall actually encourages the users at the center to interactive with the wall and as a result they exercise more, they become more active and actually it encourages them to even socialize more that would be enough that maybe we can try to make it more concise. It will be really nice when it comes up. That's what I want. Yeah. So, let's try again. But the one that you just did was actually fine. I'm just trying to get an even better than that. So let's go again. So, can you tell us about the effects of the AI wall and the benefits that it brings to your side?
A: (18:58)	I think this is a very beautiful design and so that people come here and enjoy the warm atmosphere and also they can find different icons of the district that are very good and also the interactive multi-sensory experience also facilitate their habits of moving and have more exercise and it also have social interaction with those sitting around. Because people also enjoyed just interacting with the AI wall and having fun there.

Abbreviation: AI: Artificial intelligence.

Table S4. Co-designers interview transcript

Time	Content
Q:	How did participating in the co-design process make you feel?
A: (00:04)	Very memorable, going to meetings and discussions with a group of students, it's quite nice.
A: (01:48)	Designing this pattern with students and teenagers, I feel very satisfied.
A: (00:30 – 00:34)	This time, being able to design and discuss questions (together) with students, teenagers, and the elderly through meetings and activities is very interesting.
Q	How do you think about the design? The ideas come from some features of the Wong Tin Sin District.
A: (00:25 – 00:56) (01:00 – 00:07)	I grew up under Lion Rock from childhood to adulthood, so Lion Rock came to mind first for its distinctiveness; second is Kai Tak River, because I used to fish there when I was a child; third is Morse Park, the largest park in Wong Tai Sin.
A: (00:41 – 00:51)	We have seen this picture since we were young.
A: (01:02 – 1:48)	First of all, let me introduce myself. I grew up in Wong Tai Sin. During the meeting, when the students asked me about the characteristics of Wong Tai Sin, I thought of Lion Rock first, second is Kai Tak River, because I used to fish there when I was a child, and third is Morse Park, the largest park in Wong Tai Sin. I used to play often in these places.
Q	How do you feel about seeing your ideas incorporated into the design of the illuminative panels?
A: (02:41 – 02:44)	As for being a designer, I am very happy. Actually, before I retired, my job was pattern design in fashion, and I really enjoyed designing. Especially Lion Rock, which we often see.
Q	How do you feel about the panel in this health care center? How do you feel about the texture and color change of the fabric?
A: (03:08 – 03:24)	Changing colors is fun, every movement changes colors, it's thoughtful,
A: (00:17 – 00:36)	Yes, it's the 1 st time I've seen (color-changing fabric). It's a bit like playing interactive TV games.
A: (00:47 – 01:31)	Very novel. Cloth with colors. Its features encourage seniors to be active, there are gestures (recognition), and there is general health interaction.
Q	What do you think about the gesture selected for this gesture recognition technology in the panels?
A: (03:52 – 04:00)	This sign language (gesture) is good: "Healthy body, I take responsibility" ("I am healthy, I take responsibility").
A: (05:11 – 05:20)	This is a health center (Wong Tai Sin Health Care Center), of course, the "Healthy body" gesture is good
A: (05:29 – 05:35)	Very special, representing my healthy body.
Q	How do you think about this customized design of gesture in matching the center's slogan?
A: (02:55)	Very distinctive.
Q	In what ways do you feel engaged and collaborating with us and the community through the design process?
A: (02:40 – 02:40)	I like (this collaborative design)! I'm very happy.
Q	Do you expect that the rate of adoption will be high? The elderly will like and often play with these panels?
A: (06:16 – 06:42)	Yes. We know many seniors in the elderly center, daycare homes, and daycare centers, and we would like to invite them to come and play.
A: (03:24 – 03:38)	I think these three paintings are very distinctive. Of course, I will introduce my elderly friends to come and play. I will too, the same.
Q	Overall, how has participating in the co-design process impacted your sense of belonging to the center and the community?
A: (07:02 – 07:13)	Of course (the sense of belonging is stronger), I have always had this idea to contribute to the Wong Tai Sin community.

Table S5. End-users interview transcript

Time	Content
Q:	How was your experience interacting with the illuminative panels? Did you find it enjoyable? How do you feel when following the instructions to interact with the panels? Is the exercise easy or difficult to follow?
A: (00:41 – 00:52)	The exercise instructions are very clear, and it's great! Yes, the movements are all very simple! Doing them helps loosen up the muscles.
Q	How about the interaction with the illuminative panels? Is it easy or difficult to play with them? How about your friends?
A: (00:19 – 00:29)	It's easy to play (operate), just follow the instructions on the (indicator board). It (the illuminative fabric) reacts, and we have fun playing with it.
A: (04:14 – 04:29)	It's easy to play, suitable for this health center, from 6 years old to however old! Even 80-year-olds can play, but not just 80-year-olds! Because it encourages movement, you can just stretch your arms and legs!
Q	Do you think that you will often play these illuminative panels with your friends?
A: (01:12 – 01:31)	I will introduce them (friends) to it because many of them are not familiar with the illuminative fabric, and I'll introduce them to play. Yes, when new friends come to Wong Tai Sin Health Center to see the Miss, I can introduce them to the illuminative fabric, because this design is unique to Wong Tai Sin. So, I'll introduce them to let them know.
A: (00:24 – 00:29) (00:39)	I will often play with this illuminative fabric because when the elderly come to the health center, I can introduce them to play. I will introduce my elderly friends to play with these three color-changing fabrics.
A: (00:46)	Sometimes when I'm on duty and friends are waiting here feeling a bit bored, I'll introduce them to let them know about Wong Tai Sin's special features, introduce the characteristics and specialties of the three fabrics, such as illumination, and represent the images of...
A: (01:35 – 01:40)	Yes, because many members come and go here.
A: (00:11)	Having it here, we often see it. If we introduce new friends, it can let them know about the illuminative fabric with the characteristics of Wong Tai Sin District, and help them understand its uses.
Q	How do you feel about the color change indicating that your posture and gesture are correct?
A: (01:51 – 01:59)	It changes color, it's interactive, and it responds, so we have more fun playing with it. It's quite interesting.
Q	What do you think about the esthetic of the panels? They were designed and customized based on the features of the Wong Tin Sin District.
A (02:24 – 02:50)	Of course, it can represent this area because it represents the characteristics of Wong Tai Sin District, which other areas do not have. Here we have Lion Rock, Mushroom Pavilion, Upper Wong Tai Sin Estate, Kai Tak River, which are exactly the characteristics of the Wong Tai Sin District. Other districts have their own characteristics, so this is very representative.
Q	Have you interacted with technology or used AI before?
A: (03:24 – 03:28)	It's fascinating. It's my 1 st time playing with the illuminative fabric, and it's quite fun.

Abbreviations: AI: Artificial intelligence.