

# A Design Thinking Process with 'Aspie': Developing a New Intervention for People with Asperger's Syndrome

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People with Asperger's syndrome (AS) have a rather different thinking style. They may create new ideas that the designer can see this awkward thinking style as the driver for developing new and innovative ideas. In this paper, both 'Aspie' and the designer work together to make innovative ideas, by which 'Aspie' could find a new contributive role in communal living. An ideation workshop is composed of two different stages with several ideation methods. Described is an observational study of how the ideation workshop covers their deficits and makes them adapt to generate their different ideas. From the observation, this paper realizes how we start to reestablish the relationship between AS people and the society.

**Key Words:** Asperger Syndrome; Equipment Design; Cross-Over Studies

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## INTRODUCTION

Asperger syndrome (AS), also known as Asperger's syndrome (AS), is an autism spectrum disorder (ASD) that is characterized by significant deficiencies in social interaction and nonverbal communication, alongside restricted and repetitive patterns of behavior and interests. It differs from other autism spectrum disorders by its relative development of linguistic and cognitive AS is believed to show relatively higher average intellectual abilities, and normative cognitive functioning. The diagnosis of AS was, however, eliminated in "the 2013 fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)" and replaced with a diagnosis of autism spectrum disorder on a severity scale [1-5].

People with AS may not be as withdrawn around others, compared to those with other, more debilitating forms of autism; they tend to approach others, even if awkwardly. For example, without understanding or recognizing the listener's feelings such as hope to change the topic of a conversation or end the conversation, a person with AS may have a long-winded and one-sided speech about a favorite topic [6,7]. This social awkwardness has been called "*ac-*

*tive but odd*" [8,9]. This failure to have appropriate social interaction may appear as disregard for the emotion of other people, and may come across as insensitive. Grandin (2009) thus newly suggested how to interact with technology for people with AS [10]. For instance, building upon that what most people with AS appreciated is structure in their environment, their daily routines, and their social interactions, many have an affinity with technology, governed by complex rules that might be predictable.

More recently, other than how to intervene people with AS, designers tried to look at the possibility to include people with AS in their design process to create new innovative ideas. In so doing, they were interested in the special thinking style represented as the visual-dominant thinking style in the AS people. People with AS tend to think and memorize the world as relevant photos [11]. In a similar manner, although it is not a picture-like memory, some people with AS are fact thinkers having great memory capability of verbal facts [10]. Such difference in the thinking style is often considered as one of the reasons for the communication problems in society, but the designer sees this awkward thinking style as the driving force for developing new and innovative ideas.



Fig. 1. Images of 3D cave system. 3D, three dimensions.

With the beginning of research with AS, this paper aimed to make our contribution to build a system that allowed AS children to interact with a virtual character on a big 3D cave system, which set up at the Imagine Lab, Hanyang University, to learn specific social skills (Fig. 1). A complex evaluation study was carried out to investigate the learning effects. However, when this paper started, it was happening off the screen. There was something about the way in which many AS people interacted with other people in the room while interacting with the system.

What we found were people with AS display behavior, interests, and activities that are restricted and repetitive and are sometimes abnormally intense or focused, through small gestures, often in between tasks or in reaction to the system, doing what they evidently shouldn't do. One of the most striking possible traits of AS is pursuit of specific and narrow areas of interest [12]. For example, a child had memorized the camera model numbers, whereas, caring little about the photography in the 3D scene.

Hence, in parallel to the formal evaluation study, a design team organized a participatory design (PD) session with people with AS. PD (now often called as co-design) is a methodology to design attempting to actively involve all stakeholders (e.g. employees, partners, customers, citizens, end users) in the design process to help ensure the output meets their needs and is usable. The term is used in various fields, e.g. product design, graphic design, planning, and even medicine as a way of creating environments that are more responsive and all inclusive, appropriate to their inhabitants' and users' cultural, emotional, spiritual, and practical needs.

In the PD process, inviting diverse people to the ideation step is critical. For many designers who need creative and innovative ideas do not appraise stereotypical ideas and existing ways of design con-

cepts [13-15]. Thus the differences in AS may trigger different ideas and they might have a greater possibility of being changed into an innovative idea. This might be seen as pivotal connotations to turn a relatively structured problem into a wicked problem, so much interesting is to involve people with AS in the PD process and let them guide us into the corners of the design space we have not before considered exploring.

This paper sets out a working process and describes an ideation workshop carried out with people with AS. In this design thinking workshop, how they developed social interaction would hint the way how one can prepare for a new treatment modality for AS. Thus, I argue we need a more designer oriented and participatory approach to get to those alternative roles of 'Aspie' and the ways in which they can contribute to the well-being of society. And this has consequences for our methodologies, theoretical underpinnings, as well as the philosophy we build on.

## PARTICIPATION

The field of PD has gained traction over the years, and more and more practice and research involves users and other stakeholders in the design process. While PD historically had strong ideological connotations, its widespread use has led to more pragmatic interpretations, so that today we see a wide spectrum of approaches. Accordingly, many different methods have been developed to enable people to meaningfully contribute to design processes.

When involving people with AS in the design process, participatory methods need careful interpretations. Some of the challenges include managing anxiety in social group settings, scaffolding communication during PD activities, and inspiring AS people to think beyond their narrow interests without taking away the security these provide for them. Furthermore, collaborative decision-making in design is ruled by power structures between participants, stakeholders, and designers, which are particularly complex when people with disabilities are involved. Another challenge is that of interpreting collaborative work. In many cases, people with AS cannot be expected to create or articulate design inputs, but they can contribute by providing inspirations and ideas that need mindful interpretation by expert designers.

In our workshop, AS people have been involved in every phase of the design workshop, but the given intervention goals have restricted the scope for their contributions significantly. However, such open and exploratory processes are even more messy and un-

controllable than traditional PD approaches. For example, there were three participant groups involved in our ideation workshop. Seven people with Asperger's syndrome (mean = 22.2, sd = 2.4s), two expert designers, and a moderator were involved.

The workshop was carried out in two separate stages. The objectives of stage one were adapting the ideation, sharing and realization of better ideas. The second stage was to make a real source that makes the expert designers get insight.

**1. Being accustomed to the ideation, sharing and realizing what better ideas there are**

The first stage of this workshop involved all participants: the AS participants, two expert designers, and a moderator. This stage was composed of two parts: activity 1 and activity 2.

Activity 1 is for adapting the ideation process and sharing their thoughts. Feeling free about ideation itself and sharing their thoughts was the key, so the ideation method that encourages to reveal their

ideas was chosen. Activity 1 was followed as below:

- 1) The participants got a paper, which was called 'situation-blank', individually (Fig. 2). This method was made by IMAGINE Lab in Hanyang University. It was modified from a design method 'Mandal-art' [16]. 'Mandal-art' is a tool which easily extends ideas by being filled with blank [16]. In the situation blank, there are 20 blanks. Half of the blanks are used to describe the conditions of who are using a particular object: 'I'-part. The rest of them are for the conditions what the other people are using the product: 'You'-part.
- 2) The moderator chose an object randomly (we used a bed in the workshop). Then s/he showed the way s/he come up with the ideas with the 'situation box' briefly (e.g., 'I am watching TV on the bed', 'My mother plays *Whato* on the bed'). The participants got 15 minutes and drew or write their ideas in the blanks (Fig. 3). If the participants fill in the blanks too slowly, the moderator reminds the participant about the time limit.
- 3) After filling in the blanks, all the participants shared their ideas taking turns. Because Asperger's syndrome participants have a communication problem, we observed many wandering ideas by some participants. To ease such tensions, the moderator intervened several times.

In the process, we found that none gave up the ideation session. All of them completed the 'situation-blank' paper (Fig. 4) Although there was no direction about avoiding the repeated ideas, many ideas were representing rather different situations. For instance, one participant shared his ideas. "I have one older brother. He is taller than me. I saw his ankle was out of his bed."

The second activity in stage one involved the people with AS and the moderator. The ideation process in activity one made the participants feel free to release their ideas.

In activity 2, they got a small portion of education about getting

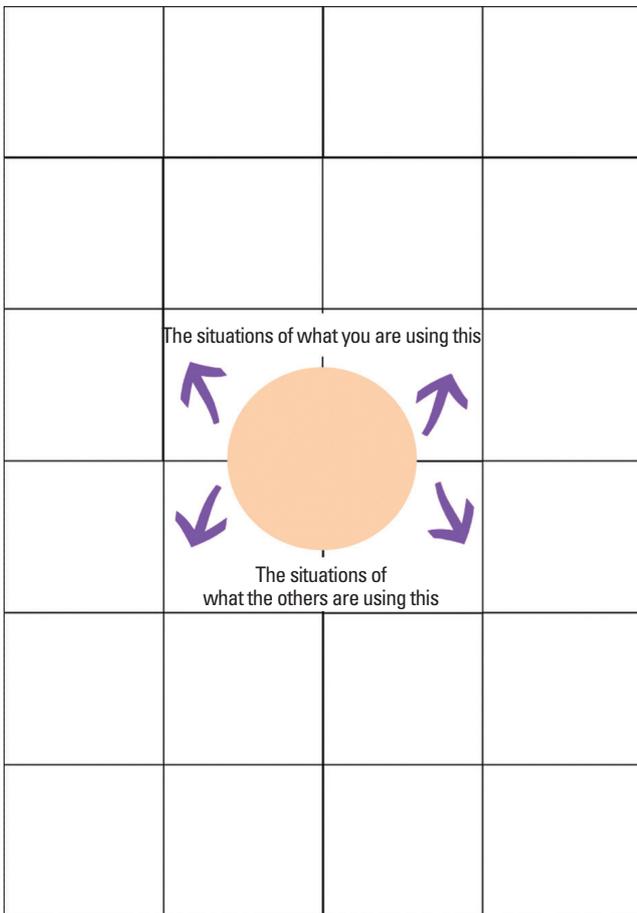


Fig. 2. The format of 'situation blank'



Fig. 3. Conducting 'situation-blank'

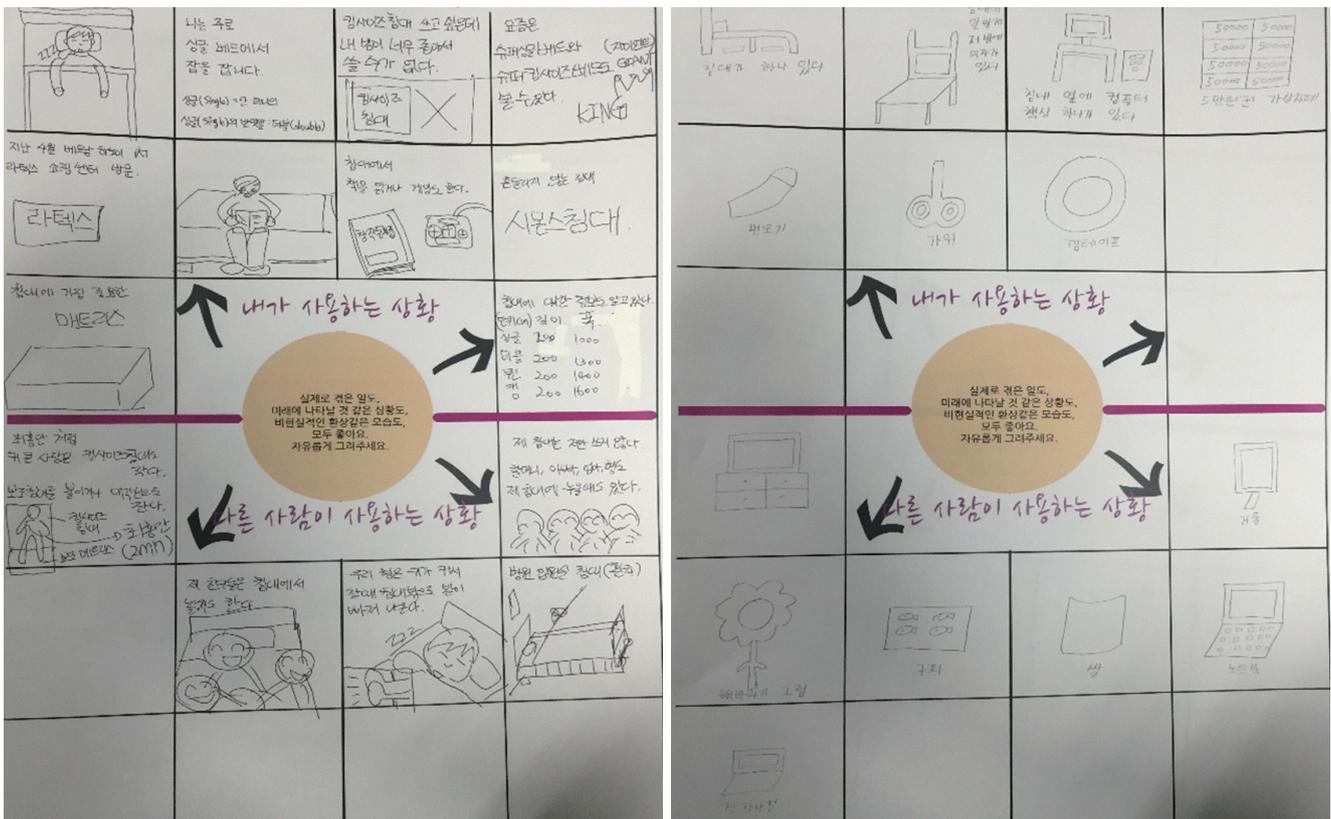


Fig. 4. The result of 'situation blank'.

out of 'functional fixedness'.

Functional fixedness means people remain bound to the basic function of the object so they fail to see new ways of use of the objects that could lead to a creative solution to a problem [17,18]. There is much research on how people can reduce the functional fixedness to promote originality or creative ideas [13]. One way to get out of the functional fixedness is using examples. Creative solutions were proposed by the people who got training with the expansive example [19]. We choose this method for educating them on the unbounded ideas. For this process, the participants were given a problem first, and then were being educated on reducing the functional fixedness with the expansive examples.

The workshop followed the steps as below:

- 1) The moderator gave a problem that they need to solve and it was modified from the popular 'marshmallow challenge' (Fig. 5). In the marshmallow challenge, the participants need to make one marshmallow at the highest point using marshmallows and spaghetti noodles within 7 minutes. And there were no other rules given.
- 2) After finishing the challenge, the moderator suggested the



Fig. 5. Problem solving.

- expansive solution examples for the marshmallow challenge. For instance, the moderator suggested that the way of attaching the marshmallow on the ceiling and lifting the table at the time of measuring the highest point of the marshmallow.
- 3) With giving expansive examples, the moderator taught what the functional fixedness is about and what better ideations are. The aim of activity 2 in stage one was to make the asperger's syndrome participants look at their idea objectively and stimulate them to strive for better ideas.



Fig. 6. Observing the images.

By conducting stage one, the AS participants experienced the ideation process and they shared their ideas even if the ideas were awkward. Also, the AS participants not only release their ideas freely but also see the ideas more objectively themselves.

In the next stage, they experienced the design method that the expert designers use. The participants made real design sources for the expert designer's motivation.

## 2. Generating the real design source for expert designer

In stage two, all participants (AS participants, two expert designers, and a moderator) were involved. The design method that the participants conducted was The Conjoint Trends Analysis (CTA). It is usually conducted to inspire designers in the early stage of design for new products [20]. The basic CTA method is composed of three steps:

1) Gathering images and keyword; 2) Ambience definition; and 3) pallets composition [21]. Because our objective was to give inspiration for the designers, the Asperger's syndrome participant didn't conduct the third step. We followed this stage as follows:

- 1) The moderator gave more than 100 images from four different topics of magazines such as cooking, living, man, and woman. First of all, the moderator and the participants saw the images together and just talked about their feeling when they see the images. Fig. 6 shows that the participants sharing their thoughts about the images.
- 2) The moderator introduced a product. Because the expert designer who participated in this workshop was from a car industry, the moderator suggested a 'toy car'. The moderator gave time to think about the car to the participants.
- 3) The moderator gave directions as follows: please, put the toy



Fig. 7. The result of conjoint trend analysis.

car in the middle. Then attach the images you get from the magazines around the toy car. Whenever you attach the images, you need to explain (1) why you choose this image, and (2) why you put the image in that position.

- 4) For 15 minutes, the participants conducted the design method freely.

The participants attached various kinds of images around the car (Fig. 7). We found that the reasons for the choices of the images were rather flexible. For instance, the participants chose the images, which have the same shapes, and colors at the first time. However, once one participant took a different turn to choose the images that are related with functions of the car, other participants started to search that kind of image immediately. Also, when the participants were sharing the reasons why they chose the images, others developed quite jumping ideas. For example, one participant put the subway maps around the toy car and he explained "Subway and car have a similar function. When we go somewhere, we use them. The subway line color in this map is the same with the car which we got. Thus, I chose this image."

## CONCLUSIONS

For a long time, the medical model dominated our views, defining being disabled by people's physical or cognitive differences and the resulting functional limitations. In the early 1980s, the disability rights movement in Europe and the States caused a rethinking of the concept, and the social model of disability gained

attraction. The terms impairment and disability were separated to convey different meanings. While the impairment defined the physical or cognitive difference, the disability was seen as a social construct that resulted in impaired people being disadvantaged by their environment.

In this sense, many people thought that the communication barrier in people with Asperger's syndrome was higher than their potentials. Hence, the relationship between technology and people with AS is still widely dominated by the medical model, because it has proven to be pragmatically useful in providing requirements for design. Technology is designed for themselves from non-disabled people. But disability studies can help us develop a more nuanced understanding to see the world and guide us to critically reflect on our attempts to help them from the non-disabled people's perspective.

An ideation workshop we have carried out several times is, in this regard, getting more important, in which AS's characteristics were enough to lower the barrier, and AS participants could be actively involved. Furthermore, the expert designers could get different insights with the results from the AS participant's different thinking styles.

We are confronted by much challenge – in practical and theoretical terms – but we believe our work demonstrates how we could start redefining the relationship between AS people and the society, by which mutual benefits in the social model (rather than medical model) would be gained in the near future.

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