EVALUATION OF TOVERTAFEL UP

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Preface

Following the use of Tovertafel UP and learning what Tovertafel UP as activity generates for people with intellectual disabilities has been an exciting and instructive assignment.

First of all, we would like to thank the staff at Skjulstagatans daily activities centre who participated in the interviews, filled in questionnaires and tirelessly wrote in the logbook. Without your commitment, this evaluation would not have been possible. We would also like to thank unit managers Johanna Larsson and Jeanette Mikkelsen for giving their support and time both to us and to their staff during the project.

Thanks also to Marie Skoghill, Assistant Area Manager at the Community Care and Services Department in Eskilstuna Municipality, who approved the project to be carried out at the daily activities centre.

A final thank you goes to Sylvia Olsson, our faithful assistant during the interviews. Thanks to you, no questions were left out.

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Introduction

The project started in 2018 when Eskilstuna Municipality discussed whether to purchase Tovertafel UP for one of the daily activities centres for individuals belonging to group 1 or 2 under the Act concerning Support and Service for Persons with Certain Functional Impairments (SFS 1993: 387) run by the municipality. The daily activities relevant to the purchase take place just outside the city in the premises of a former industrial building. Industry operation is still active on the ground floor and the daily activities take place on the second and third floors of the building. On the second floor there are two units with one staff team in each unit and on the third floor there is a unit for individuals who have a greater need for care.

Prior to the purchase of Tovertafel UP, the Municipality wanted to examine the evidence of the effects of using Tovertafel UP. However, we could not find any scientific studies related to adults with intellectual disabilities. The only materials available were a few student theses in the Netherlands which showed that Tovertafel UP can activate people with intellectual disabilities. It also has positive effects on social interaction, happiness and physical activity.

The municipality decided to purchase Tovertafel UP for the daily activities centre in question and contacted Christine Gustafsson at Mälardalen University, with whom they had previously partnered in this field when they requested an evaluation of the effects of using Tovertafel UP. Christine invited Lena Talman to the first meeting and we decided in consultation with the municipality that we would follow the implementation of Tovertafel UP and evaluate the staff's impressions of the impact of Tovertafel UP on people with intellectual disabilities. Lena Talman has been the lead researcher in this project and is also the author of this report.

Background

Tovertafel is a device that contains a projector, Infrared sensors, speakers and a Central Processing Unit, which work together in order to project games. Tovertafel is mounted on the ceiling and, for example, above a table at a daily activities centre or healthcare unit. The games that have been developed respond to hand and arm movements and users play with the light (the game) projected by Tovertafel. The first Tovertafel unit, Tovertafel Original, was designed by Hester Le Riche as part of her PhD study at the Delft University of Technology in the Netherlands (Anderiesen, 2017). This first device was intended for elderly individuals in the mid to late stages of dementia living in care homes. According to Anderiesen, research shows that 90% of people with dementia living in dementia care homes are often apathetic and apathy affects their physical, cognitive and emotional well-being. Tovertafel has been developed with the aim to design a product service system that stimulates individuals in the mid to late stages of dementia living in dementia care homes in order to reduce apathy.

Tovertafel Original was developed in cooperation with people with dementia, their relatives and healthcare professionals and was launched in 2015. Initially, six games were developed for Tovertafel Original, where playful interactive light animations were projected on dining tables in dementia care homes. The games were evaluated in a small study focusing on the effect of the games on reducing apathy for residents with moderate to severe dementia. The results showed a significant improvement in the residents' physical activity as well as increased social interaction and happiness. The results also showed a reduction in fear, anger and grief. In conclusion, Anderiesen (2017) showed that codesign is possible with people in the mid to late stages of dementia and that Tovertafel is able to reduce apathy.

In conjunction with the launch of Tovertafel Original for individuals with dementia, it was found that there was also demand for such device for individuals with learning difficulties. Tovertafel UP, the successor to Tovertafel Original, intended for individuals with learning difficulties, was launched in April 2016. This product has also been developed in collaboration with the individuals themselves and their staff.

For more information about Tovertafel Original and Tovertafel UP, see: https://tovertafel.se/

Tovertafel at the daily activities centre

Tovertafel UP was first installed in the common room on the second floor of the daily activities centre and the initial idea was for it to remain there for a week and then be moved up to the third floor for a week. Tovertafel UP would be continuously moved between the two floors at one-week intervals. This, however, turned out to be difficult in practice as it took two people to move the unit because of the high ceilings in the premises. As a result, Tovertafel UP was installed permanently on the second floor instead. After a while, however, it was discovered that the location presented some difficulties because there was quite a lot of movement in the common room. Therefore, Tovertafel UP was eventually moved to the third floor where there was an empty space that was slightly tucked away and thus provided a calmer environment.

Purpose

The purpose of the project was to evaluate the staff's experience of using Tovertafel UP at a daily activities centre and determine whether, according to the staff, the use of Tovertafel UP results in any development for people with intellectual disabilities with focus on physical activities and social interaction.

Method

The evaluation is predominantly qualitative, focusing on the staff's experience of using Tovertafel UP in their daily work at the daily activities centre. The daily activities centre is for adults with severe intellectual (and multiple) disabilities. In the evaluation we have used group interviews, questionnaires and logbooks. According to Denscombe (2000), more than one method should be used because this would produce more accurate results. The unit managers of the daily activities centre were contacted, and they asked their staff whether they were interested in participating in the study. Since all three staff teams expressed a positive attitude, the first meeting was booked for an initial group interview focusing on how the centre worked and what activities were available. All interviews were conducted at the participants' premises in connection with their staff/training meetings as these were the occasions which most staff members attended. The interviews averaged one hour.

The first group interviews with the working teams at the daily activities centre were conducted prior to installing Tovertafel UP at the daily activities centre. On this occasion, the staff received oral information about the evaluation as well as written information in the form of an information letter. Together with the information letter, the staff also received a consent form which they had to sign if they were interested in participating in the group interviews, filling out the questionnaire and documenting the use of Tovertafel UP in the logbook. This first group interview was about the activities at the daily activities centre and what activities were available. Based on this interview, a questionnaire with a 6-point scale ranging from not meaningful to very meaningful was prepared with the available activities and the staff participating in this questionnaire had to estimate how meaningful (for the user) they believed each activity to be.

After the first group interview was completed and the questionnaire was filled out, the staff received introduction/training on how Tovertafel UP worked. In conjunction with the installation of Tovertafel UP, it was decided that the staff should use Tovertafel UP in a structured manner at least twice a week. They also had to register in the logbook each use of Tovertafel UP. Compiling logbooks took place from 11 March 2019 until 5 February 2020.

After four months of use of Tovertafel UP, an additional group interview was arranged for follow-up. This interview was about the use of Tovertafel UP. The question that was asked was "*How do you think Tovertafel worked as an activity?"* with the follow-up questions "*For you as a staff member?"* and *"For the users?"*. We also followed up with the same questionnaire in order to measure the meaningfulness of the activities, but this time Tovertafel UP had been placed among the other activities. Subsequently, the staff members continued to register in the logbook each use of Tovertafel UP.

Participants

Participants in this study are adults (18-65 years) who have their daily activities on Skjulstagatan but also care staff. The adults who have their daily activities on Skjulstagatan have either profound intellectual disability or profound intellectual and multiple disabilities. These adults are referred to as users in the result.

Processing of data

All interviews were recorded and the interviews that were held before installation of Tovertafel UP were listened to in their entirety. Every mention of an activity available at the daily activities centre was registered because the purpose of this interview was only to acquire information about current activities in order to prepare the questionnaire. The interviews that were held after the installation of Tovertafel UP were transcribed word for word and then analysed using content analysis inspired by (Sandelowski, 2000). According to Kvale (1997), interview analysis starts at the time of the interview and then continues during the transcription process. The coding categories were partly formed during the interviews, and during the transcription these started to assume a more definite shape. Therefore, the transcription was read through in order to switch the focus back to the whole. After that, the text was read once again, this time focusing on previously observed categories/themes.

The surveys were compiled in Microsoft Excel in order to conduct a simple analysis of how meaningful the staff felt Tovertafel UP was for people with intellectual disabilities. This analysis is presented in a chart form. The logbooks were analysed with a focus on their content regarding the purpose of the activity and the results of the activity performed. This analysis was also inspired by Sandelowski's (2000) content analysis. In addition to the main purpose, logbook information was compiled about the number of users and staff members for each activity and how long it lasted.

Results and analysis

The presentation of the results from collected data is divided into three parts. The first part presents the results of the group interviews based on what has emerged from the reading and analysis of the interview texts. The second part presents the results of the questionnaire distributed to the staff. The third part presents the results of the logbook with the results broken down in the report based on themes and categories that have emerged from the reading and analysis of the logbook.

Group Interviews

The group interviews showed that the staff were positively surprised by the effects they observed in users of Tovertafel UP. One example of this was provided by a staff member when she reported that she was surprised at how users could focus when playing games with Tovertafel UP.

> I think it is, if taking the person, I work with most, developing, to see that something happens, that the person gets more engaged and, begins to understand what happens when you press on a particular place in the game, it gets a bit exciting. Something is happening, being able to focus, for a person who may have a little difficulty being focused, all of a sudden, the person is sitting and being focused despite people passing by, which I find great, and also think it´s enriching.

Although the staff mostly had a positive attitude towards Tovertafel UP, they also said that some users showed little or no interest in the activity, as illustrated by the following quote:

> I have some people who do not participate, one who is very sceptical pushed the table away and didn't even want to be near it, and one participant who can't see or move the hands, so it doesn't work, and one who only prefers to take coffee breaks at the table.

The staff reported that physical activity for users and interaction between s increased when using Tovertafel UP. The staff also said that they had realised that users were interacting and could wait for their turn to a greater extent than before. Other positive effects reported by the staff were users who helped each other participate in the current game by, for example, pressing the balloon (the balloon game) for the user who had difficulty engaging in activities. The most surprisingly positive effect, according to the staff, was that some users, who developed their skills about interaction and being able to wait for their turn used their new skills in other activities at the daily activities centre. The following three quotes illustrate this:

> I think it is so cool to see turn-taking and interaction in the group; "- No, now you have to wait for your turn." and then it's like, okay. This also reflects into other activities, when we play memory, you need to wait for your turn. Some participant is dominant, or you can say take over too much, then we mention; "- she also wants to press a little, you can take more over here so she can take a more over there ", "- Yes yes," the participants say, so it also helps to invite others.

> We have a girl that makes the game objects go closer to those who have hard to reach to help their play. "- Is it something you have seen a tendency for in another context (ask the interviewer)?" "- No, I don't think so, but I don't know if we've had anything like this, but no, no, I don't think so."

> One of the games spread round bubbles in circles around the table, or soap bubbles, I've had participants around the table and instruct; "-Now you have to wait until the bubble comes to you. They then have to wait, and when the bubbles come to the participant, they smash the bubbles. For some, it takes longer to respond while others are direct, so it's clear that it's extra itching then, and you understand what exercise it is to control every time, it is huge. Even if the person can't do that, they still have the treat, to see something beautiful and observe, and they seem to get something out of it.

As regards the use of Tovertafel UP, the staff expressed a positive opinion as they considered that Tovertafel UP was very user-friendly and it was great that not a lot of technical know-how was required to use it. The staff considered that the frequency of using Tovertafel UP would probably have been significantly lower if it had not been so user-friendly. One disadvantage of Tovertafel UP according to the staff is that Tovertafel UP is not portable enough. As the daily activities take place on two different floors, the abovementioned had planned for Tovertafel UP to be used for a week on each floor, but this was not possible so Tovertafel UP is now permanently installed on the third floor. The staff said that it was a disadvantage that some users could not use Tovertafel UP because of that. Therefore, a request from the staff is to make Tovertafel UP more portable if possible.

> In my opinion, it worked better when it was down here, for us at least. It is more cumbersome for us to go to it now, it is a more controlled activity, and then it can be skipped many times because there is something else, yes, because it takes more staff, to get started. We have so many wheelchairs that it takes a while to get them up to the activity. We also have some who don't leave our unit, so they don't get a chance to try. I have a user who played while it was here but doesn't want to come along now, so it is a shame…but those who get to play are very happy.

Another thing about the use of Tovertafel UP that the staff requested also had to do with portability and the surrounding environment. It was hard to get close to the table for the people in wheelchairs. Another request was for Tovertafel UP to be possible to rotate so that the games could be projected onto the wall as, according to the staff, this would facilitate users who were not so mobile.

> We realized that we could have the games on the floor and then you know this sound effect, that something happens if you ride in your wheelchair over and you get to use your feet.

According to the staff, the table set-up was not optimal, and they pointed out that some of the users' wheelchairs were large and that this made things more difficult. Therefore, it was considered important to adapt the table to the users' needs for them to have an optimal experience of Tovertafel UP.

The staff also had a lot of concerns before they tested Tovertafel UP. That it could provoke epilepsy, that there would be too much activity and that the staff would go on for too long so that users would get too tired. Other concerns were how to move Tovertafel as it was heavy, and they were afraid they could drop it and break it. When asked about these concerns, the staff replied

> There was no move involved because we had it permanently installed on the third floor. We have not noticed any epilepsy attacks, not even tendencies to such or fatigue, I think it's more, maybe, that a person doesn't move that much and pulls back their hands, just sitting. As we then can see when they get tired.

In conclusion, the interviews show that the use of Tovertafel UP for most users has involved developing their minds, especially in terms of activity, social interaction and interaction with others.

Questionnaires

The staff together responded to a total of 33 surveys on meaningfulness for users based on their own perception. The questionnaire responses show that three of the 33 users have not yet tried Tovertafel UP since staff commented their answer with the phrase "have not tried yet". This may be because some users in one of the units on the second floor do not feel comfortable leaving their unit unattended. The questionnaire summary showed that a Tovertafel UP was not meaningful at all for one user and not very meaningful for four of the Tovertafel UP users. For the remaining 25 users, the result shows that Tovertafel UP was meaningful or very meaningful (Figure 1).
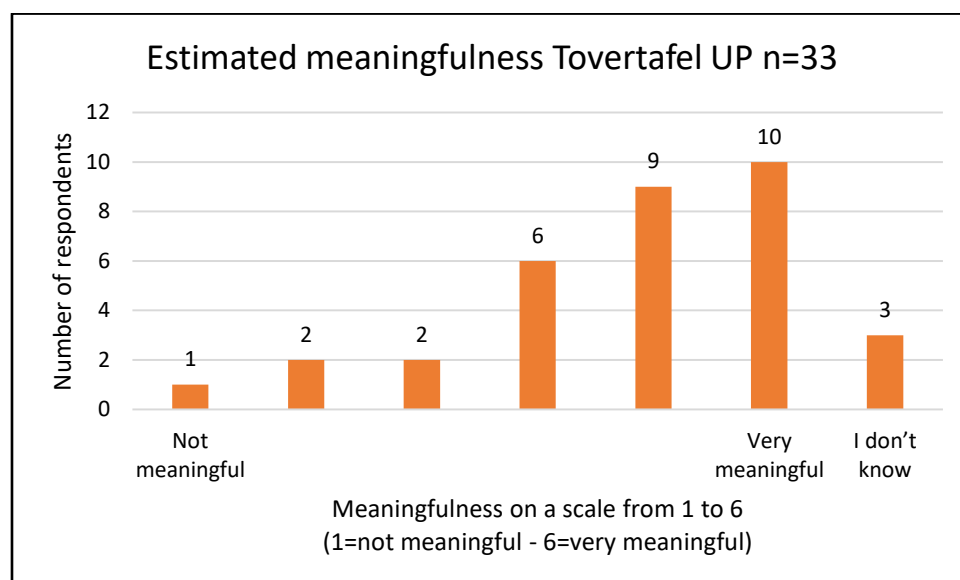

Figure 1. Estimated meaningfulness of Tovertafel UP.

Logbook

The logbook contains 177 activities. 61 of the activities are for individual users, while 59 activities are carried out in small groups of two to three persons, 19 activities are carried out in slightly larger groups of four to seven people and for 38 activities there is no information on the number of participants. As regards participating staff, the number of participating staff members is specified for 174 of the 177 activities. The number of staff involved varies from one to four, but the most common is one staff member. According to the logbook, one staff member has participated in 119 of the 177 activities logged.

The usage time varies between 5 and 60 minutes but the most common time is 15–20 minutes. Different games are selected. Sometimes only one game is used and sometimes all games are used. However, the most common is that three to four games are used in the activity. Unfortunately, based on the logbook analysis, it is not possible to say with certainty whether any of the games are more common than others, because the staff use names for the games that they themselves have come up with. However, one game seems very popular considering how often it is used. It is a game the staff call Flowers but whose real name is probably Bouquet. Because of the subjective names of the games, it is not possible to tell from the logbook analysis exactly which games are used, although there are sometimes links to the games as in the example of Flowers/Bouquet above. However, it is more difficult, for example, to link the subjective name "Balls" to the right game.

According to the logbook, there are number of purposes for using Tovertafel UP. For example, the logbook shows that physical activity, taking turns and social interaction are recurring purposes of the activity. Recurring results based on the purposes are, according to the logbook, that the users are active, appreciate the company and learn that they have to wait for their turn in the games.

Based on purpose and result in the logbook the analysis has led to four themes: Activity, Interaction, Community and Stimulation. The three themes Activity, Interaction and Community each contain two subcategories, while the theme "Stimulation" contains three subcategories (Table 1). The results are presented based on the four themes that have emerged from the analysis and logbook entries are used to highlight the staff's own words.

Table 1. Themes based on Logbook analysis

THEMES	CATEGORIES
Activity	Physical activity To focus
Interaction	To take initiative To take turns
Community	Social interaction Group activity
Stimulation	To arouse curiosity To stimulate the senses Joy

Activity

The theme *Activity* contains two categories: *Physical activity* and *To focus*. These two categories appear in the logbook entries very often and are the most common purpose of the activity. For examples of this theme and its categories, see Figure 2.
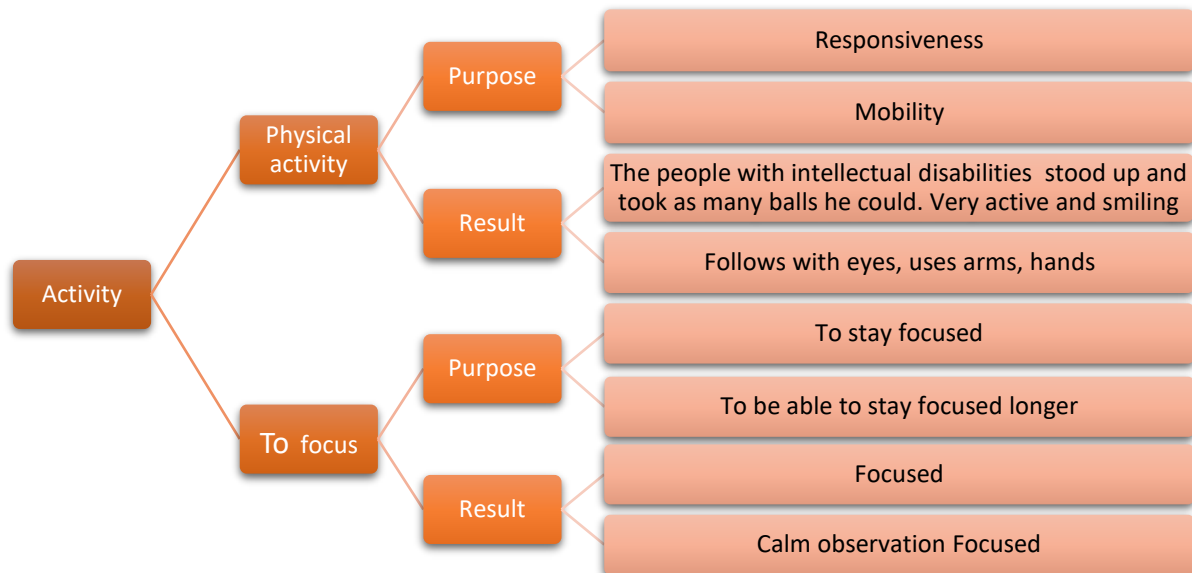
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                                    ┌─────────────────────────────────────────────┐
                                    │              Responsiveness                 │
                        ┌─Purpose───┤                                             │
            ┌─Physical──┤           │                 Mobility                    │
            │ activity  │           ├─────────────────────────────────────────────┤
            │           │           │ The people with intellectual disabilities   │
Activity────┤           └─Result────┤ stood up and took as many balls he could.   │
            │                       │ Very active and smiling                     │
            │                       ├─────────────────────────────────────────────┤
            │                       │      Follows with eyes, uses arms, hands     │
            │           ┌─Purpose───┤            To stay focused                  │
            └─To focus──┤           │                                             │
                        │           │       To be able to stay focused longer      │
                        │           ├─────────────────────────────────────────────┤
                        └─Result────┤                 Focused                     │
                                    │          Calm observation Focused            │
                                    └─────────────────────────────────────────────┘
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Figure 2. The theme Activity with its underlying categories and logbook entries based on purpose and results.

Physical activity

As regards the *Physical activity* category, according to the logbook, the purpose of this category is primarily responsiveness and mobility (Figure 2), but the purpose of the activity is also to "Initiate activity, dare move your hands across the table", "Offer physical activity and choice", "Be active with your body", "Joy of movement", "To actively move and relate to something happening when I touch the images" or "To promote activity and movement". To arouse curiosity." Examples of results documented by staff members in the logbook include that the user is "Physically active", "Uses left hand and arm", "Caught and hit colour balls with the help of staff". According to the logbook, one person was engaged in the activity too despite blindness "Could be engaged despite blindness" and when Tovertafel UP was used on the floor by people with impaired mobility in their arms, the logbook shows that "First person stands up and trains balance and is active. The other person becomes active with legs instead of arms, the person is otherwise sitting on a Sacco bean bag".

To focus

Based on the logbook, the *To focus* category contains the purposes "Trying to focus", "To focus", "To maintain focus" and "Concentration". The logbook result, based on these purposes, is that the user is "Happy and calm", that "Everyone was focused" when the activity was used in a group. But sometimes it can be difficult to focus, and the logbook shows that it can be "difficult for someone to stay focused" and that "A user loses focus occasionally, but no difficulty in getting it back".

Interaction

Taking initiatives and coping with *Taking turns* are the two categories that make up the *Interaction* theme based on the logbook analysis. Examples of the theme and its categories are illustrated in Figure 3
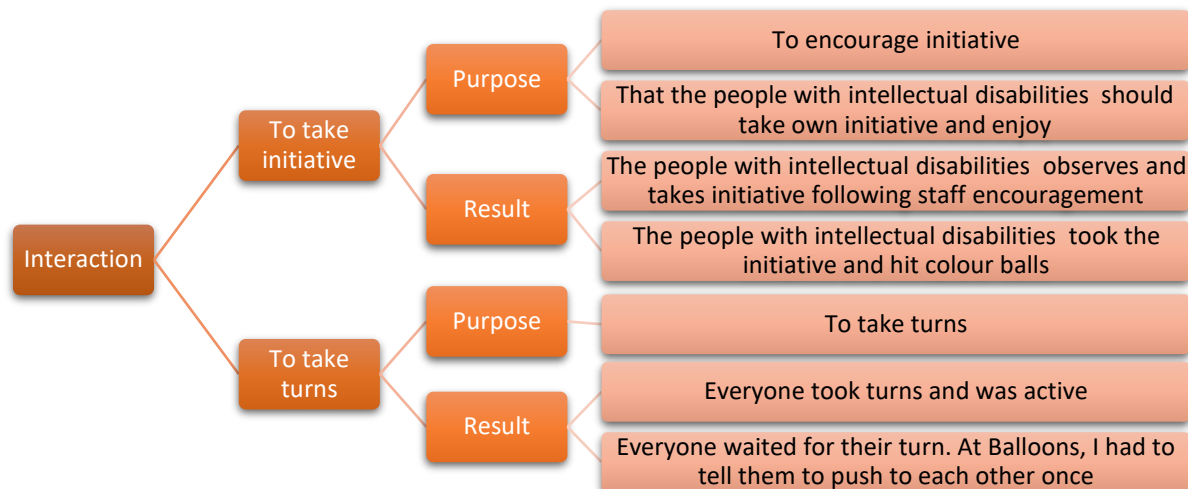

Figure 3. The theme *Interaction* with its underlying categories and logbook entries based on purpose and results.

To take initiative

As far as the *To take initiative* category is concerned, it is usually about staff encouraging initiative or that the purpose of using Tovertafel UP is for the user to take own initiative in the activity, but also to make sure that this initiative brings joy (Figure 3). Other purposes of the activity are similar, according to the logbook, and examples of what is documented include "Stimulating initiative", "Interaction with others, attracting initiative" or "Taking initiative". The results in the logbook indicate that users take initiative (Figure 3) and that in some games it may be more difficult to motivate users "They take the initiative and take the different objects. A user understands the connection that they have to touch the stones when they appear. A little harder to motivate them to sweep leaves in order to find ladybugs". A frequently occurring initiative is that users choose games themselves as evidenced by the following logbook entry "Users choose games by pointing to the symbol of the game when we browse the games" or they take the initiative to switch games "Users felt satisfied and took the initiative to let us know when they wanted to change games".

To take turns

The purpose of the *To take turns* category is to train each user to wait for their turn, which usually worked well according to the following entries in the logbook "Understood the games without instructions. Taking turns worked well", "Users show consideration for each other and some interact with each other". "Users take turns choosing the games. They interact and laugh out loud." When it comes to taking turns, the logbook also shows that the result may depend on the game being played. "When taking turns at the game where you have to match the right image, the staff had to say who was next.

At the other games, everyone stayed on their turf." However, according to the logbook, the staff sometimes had to motivate users in order for taking turns to work, of which the following two entries are an example "One of the users was more active. The staff had to justify sharing the playing field", "Took turns with the support of staff. Everyone was active".

Community

Community is highlighted in the logbook and categories identified by the analysis as belonging to this theme are *Social interaction,* which is very much about interaction between the different participants or between participants and staff, the second category, *Group activity*, is more about being able to be in a group and communicate in the group (Figure 4).
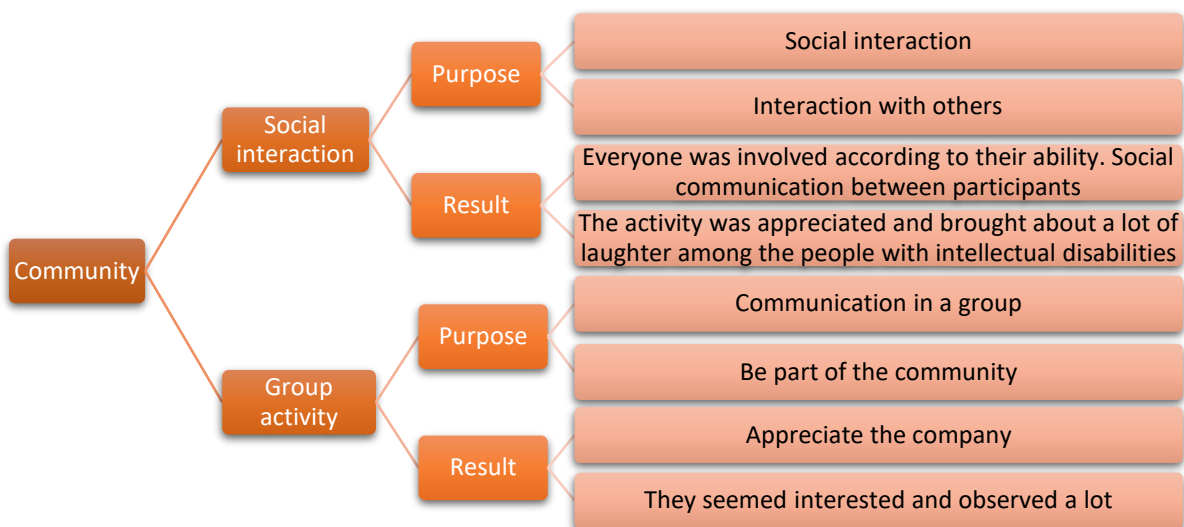
Figure 4. The theme Community with underlying categories and logbook entries based on purpose and results.

Social interaction

The Community theme involves a great deal of the social interaction category where the purpose for users is to interact with each other with the help of the activity as confirmed by the following logbook entry "A moment together and see who is active". When it comes to social interaction, it also focuses on communication and having fun together according to the following logbook entries "Communication and laughter!" The results from the logbook show that this seems to work well on most occasions "The activity was appreciated and brought about a lot of laughter", "Everyone was involved according to their ability. Social communication between the participants".

Group activity

The purpose of the *Group activity* category is first and foremost to be part of a group when performing a joint activity, and the results from the logbook show that users "Seemed to appreciate the company—somewhat active as the company consisted of three persons" and that users also show interest in hanging out in the group "The group is large and JU is interested in the interaction". However, it can also sometimes be a little more difficult with group activity as the following entry in the logbook shows "H hits the table hard, JK is initially a little frightened but then relaxes and observes" or that the group activity works for a little while, but that interest in the activity does not disappear according to the following logbook entry "Participated for 10 minutes, then left the table and participated at a distance". Sometimes, however, the purpose of having a group activity does not work at all as this logbook entry shows "Today no great interest in the activity".

Stimulation

Stimulation is the fourth and last theme that emerged from the logbook analysis, and this theme contains the categories *To arouse curiosity*, *To stimulate the senses* and *Joy* (Figure 5).
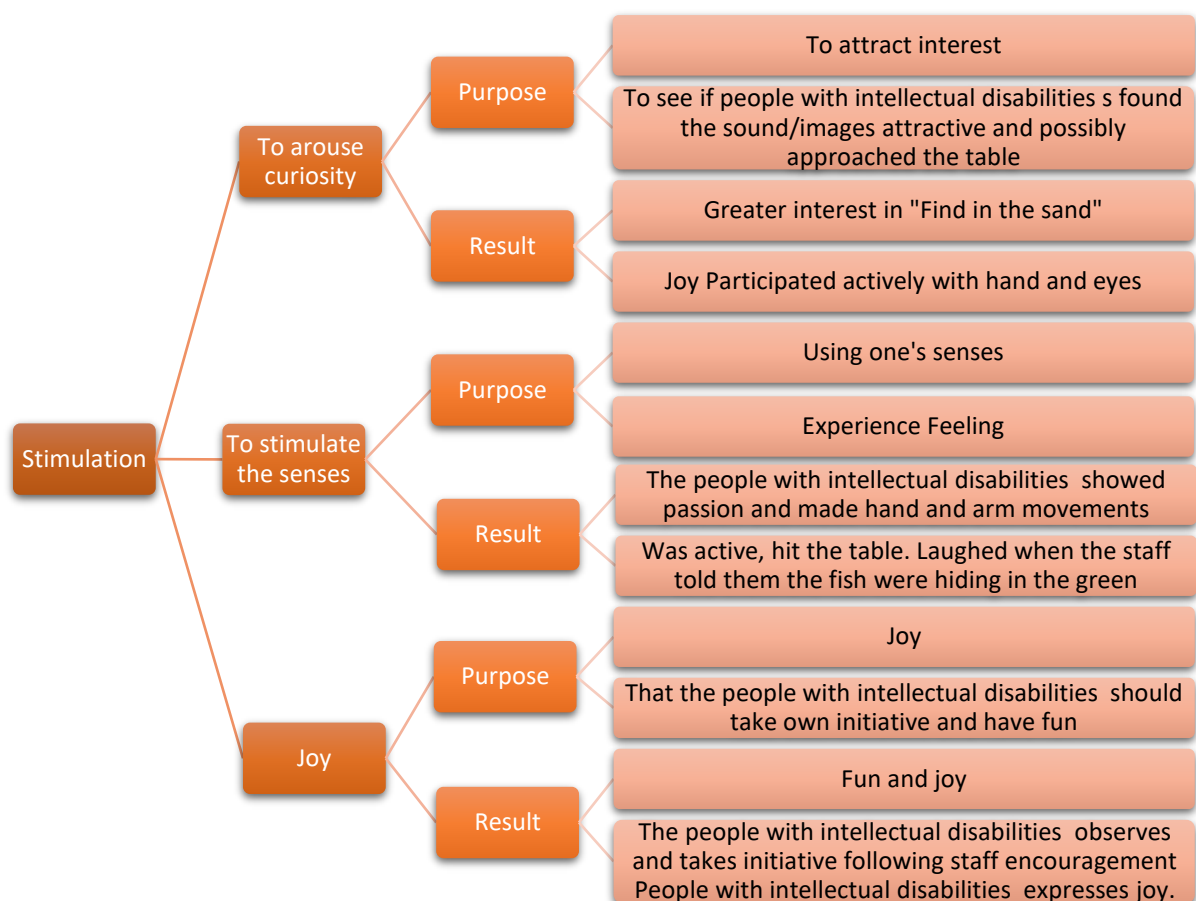

Figure 5. The theme Stimulation with underlying categories and logbook entries based on purpose and results.

To arouse curiosity

The *To arouse curious* category is a lot about introducing the activity and seeing if it works for the user. The purpose, according to the logbook entry, is therefore described as follows "Introduce the activity", "Introduction, arouse interest" or "Get M interested in approaching the table". The result of this purpose is that the user "Showed interest, was active", "Was engaged and worked voluntarily to capture the images on the table (with arms, hands, fingers)". Interest in the activity can also be linked to sensation as the following logbook entry shows "Shows interest in the music to Flowers, shakes head and smiles at the flowers for shorter moments". But sometimes the activity does not attract much interest "The user did not want to do the activity independently. Was a spectator", and sometimes it is quite difficult to arouse the user's curiosity about the activity "The user did not approach the table. Stayed a bit away, seemed to be listening—then moved on".

To stimulate the senses

The second category, *To stimulate the senses*, just like its name, is all about stimulating the user's senses or allowing them to experience some kind of "Sensory stimulation". According to the logbook entries, this stimulation mainly concerns stimulation of the hearing "Hearing splashing and participation due to visual impairment, dementia" or of the vision, "Stimulating the vision and doing actions and linking to what happens". The logbook results show that the activity seems to work well as far as sensory stimulation is concerned: "Pulled her hand over table, was satisfied when AH said she hit the bubbles", "The user seems fascinated by the sounds and visual impressions", but it can sometimes be difficult with certain games as this logbook entry shows "The person has visual impairment and had difficulty with moles where the colours merged".

Joy

Joy is the last category in the *Stimulation* theme and the purpose of this category is often associated with interaction, initiative and activity according to the following logbook entries "Activation, interaction, joy", "Activity, joy, taking initiative, interaction". But there are also logbook entries that link happiness to taking turns, which the following logbook entry is an example of "Taking turns is fun". The logbook results show that joy is common and some of the following logbook entries highlight the joy of the activity "Puppy laughs and watches, talks about puppies", Balloon—he laughs out loud when it pops. He is active in sounds and splash balls and touches the balls. He is also active in soap bubbles, puppies and balls with points".

In conclusion, the logbook shows that the use of Tovertafel UP stimulates different senses, increases user activity and the interaction between them and the activity is positive for the community on a day-to-day basis.

Final reflection

The results of the evaluation show that Tovertafel UP for adults with intellectual disability appears to have a positive impact in various areas. For most of the users who have tried the activity, it seems to be meaningful or very meaningful, but there are also users who show little or no interest in the activity. Users often make active choices about which games they want to play and usually play three to four games in 20 minutes. As far as the use of Tovertafel UP is concerned, according to the staff, it is simple, but there are requests to make Tovertafel UP easier to move around the premises. The use of Tovertafel UP has resulted in increased concentration among many users as they can today focus for longer periods than before. Physical activity, collaboration and social interaction have also increased for many of the users and have developed positively in terms of showing consideration and helping each other when playing the games. The activity is a good stimulus to the mind of users even when they have impaired hearing or vision. It has also emerged to the surprise of many that users interact and can wait for their turn to a greater extent than what they could in the past, and some users have used their newly acquired knowledge in other activities. Regardless of the purpose of the activity, for most users it has brought many pleasant moments with a lot of laughter and joy.

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