

**Explore More Outdoors**

**Semantic Development and Experience-Based Learning During Outdoor Activities with  
Students with Congenital Deafblindness**

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### **Abstract**

Semantic development of students with congenital deafblindness is severely impacted by their dual sensory loss. While studies on outdoor activities found positive results for persons with congenital deafblindness regarding language development, empirical research on the implementation of outdoor activities and corresponding educational strategies at schools for students with congenital deafblindness is scarce. The present study explored the implementation of outdoor activities at schools for students with congenital deafblindness, located in Belgium, Croatia, Germany, Greece, The Netherlands, Norway, Sweden, and Switzerland. This study focussed on outdoor activities, applied strategies to stimulate semantic development, and the use of principles and conditions of experience-based learning. A mixed method approach was used, including a questionnaire (n = 19) as well as focus group discussions (n = 12), to gain an in-depth insight from educational professionals' practical experiences. A total of 85 different outdoor activities were mentioned. Educational professionals considered a focus on stimulating semantic development during outdoor activities important, and 15 applied strategies were mentioned. The use of experience-based learning was likewise considered important, and 16 out of 20 principles and conditions were described. The findings of the current study provide a valuable foundation upon which future research can build. Further research might support or extend the current findings by further exploring the implementation of and strategies used during outdoor activities. For practice, it is recommended to regard the findings of this study as a collection of experiences from which to draw inspiration.

*Keywords:* congenital deafblindness, outdoor activities, semantic development, experience-based learning, mixed method research

## Samenvatting

Semantische ontwikkeling van leerlingen met aangeboren doofblindheid wordt aanzienlijk verstoord door hun beperking in horen en zien. Terwijl onderzoek naar buitenactiviteiten positieve resultaten heeft gevonden voor de taalontwikkeling van personen met aangeboren doofblindheid, is empirisch onderzoek naar de implementatie van buitenactiviteiten en toebehorende onderwijsstrategieën op scholen voor leerlingen met aangeboren doofblindheid schaars. Het huidige onderzoek onderzocht de implementatie van buitenactiviteiten op scholen voor leerlingen met aangeboren doofblindheid, gelegen in België, Kroatië, Duitsland, Griekenland, Nederland, Noorwegen, Zweden, en Zwitserland. Bij dit onderzoek lag de nadruk op ondernomen buitenactiviteiten, toegepaste strategieën om semantische ontwikkeling te stimuleren, en het gebruik van principes en randvoorwaarden van ervaringsgericht leren. Een mixed method aanpak is gebruikt, met een vragenlijst (n = 19) en focus groep discussies (n = 12), om een diepgaand inzicht te verkrijgen vanuit de praktijkervaringen van onderwijsprofessionals. Er zijn in totaal 85 verschillende buitenactiviteiten genoemd. Onderwijsprofessionals vonden een focus op het stimuleren van semantische ontwikkeling tijdens buitenactiviteiten belangrijk en er werden 15 toegepaste strategieën genoemd. Het gebruik van ervaringsgericht leren werd eveneens belangrijk gevonden en er werden 16 van de 20 principes en randvoorwaarden beschreven. De bevindingen van het huidige onderzoek vormen een waardevolle basis waarop toekomstig onderzoek kan voortbouwen. Verder onderzoek kan de huidige bevindingen ondersteunen of uitbreiden door de implementatie van en de gebruikte strategieën tijdens buitenactiviteiten verder te onderzoeken. Voor de praktijk wordt het aanbevolen de bevindingen van dit onderzoek te beschouwen als een verzameling van ervaringen waaruit inspiratie kan worden opgedaan.

*Trefwoorden:* aangeboren doofblindheid, buitenactiviteiten, semantische ontwikkeling, ervaringsgericht leren, mixed method aanpak

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## **Explore More Outdoors**

### **Semantic Development and Experience-Based Learning During Outdoor Activities with Students with Congenital Deafblindness**

Deafblindness is a condition characterised by the co-occurrence of visual and auditory impairment, which varies regarding severity, as well as onset of the sensory impairments (Dammeyer, 2014). Persons with deafblindness may also present varying degrees of additional motor and/or cognitive impairments. In the case of congenital deafblindness (hereafter referred to as CDB) the dual sensory impairment is present from birth or prior to the development of language (Dammeyer, 2014).

All persons with deafblindness, regardless of the time of onset or severity of their dual sensory loss, experience major challenges regarding communication, information access, orientation, and mobility (Dammeyer, 2014). It is noteworthy that the impact of deafblindness on language and communication development is considered to be more severe for persons with an earlier onset of deafblindness, such as those with CDB (Ask Larsen & Damen, 2014).

Studies have shown that positive results can be achieved for persons with CDB through the use of outdoor activities. A case study, involving one person with CDB, found that outdoor activities can provide new stimulating experiences as well as learning opportunities (Gibson, 2000). Participation in the outdoor activities resulted in an increase in health and mobility as well as increased confidence, increased awareness of the environment, increased concentration, new vocabulary learnt in a practical context, development of relationships with staff, increased interaction, and increased patience (Gibson, 2000). A subsequent longitudinal case study of two persons with CDB (Gibson, 2005), substantiated the findings of the previous study, and also found that engagement in outdoor activities resulted in further development of communication of the two persons with CDB. Moreover, based on the results of a case study conducted by Gibson and Nicholas (2017), involving one person with CDB, the researchers suggest that outdoor activities can facilitate the development of a consistent and well-organised autobiographical memory, including relevant sensations, thoughts, feelings, and meaning making. Finally, the long-term outdoor Bua-mi (“my-house”) project, involving two persons with CDB and their support staff building a small house, showed positive results for both persons’ development of language, learning of skills, development and understanding of signs in context, building relationships, network building, creating authentic experiences, generating authentic emotions, understanding of concepts, and health (Gibson et al., 2020).



Despite the reported positive results, empirical research on outdoor activities with persons with CDB is scarce (Gibson, 2000). In an exploratory study Gibson and Heineman (2020) investigated the implementation of outdoor activities at a Norwegian school with students with CDB. The study identified several ways in which the school's teachers used outdoor activities. There were differences regarding the outdoor activities used, the overarching goals for the outdoor activities and the curricular areas that the activities sought to address. Gibson and Heineman (2020) recommended further research on implementation, for example at other schools with students with deafblindness. Nevertheless, as far as we know, such research has not yet been conducted.

The reported differences in the use of outdoor activities and lack of empirical studies on outdoor activities at special schools for students with CDB, underscore the need for research on the implementation of outdoor activities in curricula of such schools. This study investigates such implementation, with a specific focus on semantic development, as well as experience-based learning. The relevance of this current study's focus on semantic development and experience-based learning is clarified in the following paragraphs.

The relevance of focusing on semantic development lies in the impact of CDB on communication and language development. Semantic development can be described as the development of the ability to encode relevant relations about word meanings and object properties (i.e., concept learning) (Denervaud et al., 2021; Vales et al., 2020). It is suggested that semantic development is an important prerequisite for further language development (Binger et al., 2020). Furthermore, organised semantic knowledge has been found to support other cognitive abilities such as memory, word learning, language processing, inferential reasoning, knowledge acquisition and creative thinking (Kenett & Faust, 2019; Vales et al., 2020).

Semantic development in persons with CDB is impacted by the challenges associated with their impairments. These challenges, such as self-abusive or socially isolating behaviours, hinder their ability to engage in face-to-face dyadic interactions (Janssen et al., 2002, 2003, 2004; Luiselli, 1992). Furthermore, the involvement of a third entity in interactions, known as triadic interaction, is hindered by their impairments (Hartmann, 2012). This limits their acquisition of information and knowledge about objects and linguistic symbols (Hartmann, 2012). Additionally, their dual sensory loss reduces their ability to observe language usage among others (Bruce, 2005). Consequently, individuals with CDB have restricted access to social interactions and the information necessary for semantic development. This makes persons with CDB reliant on others, who are knowledgeable in

communication development, to provide strategies to compensate for the barriers imposed by CDB (Bruce, 2005).

Semantic development is stimulated when persons with CDB engage in activities, gathering (new) experiences that expand their view on the world (Miles & McLetchie, 2008; Vales et al., 2020). Outdoor activities can offer such experiences (Gibson, 2000, 2005).

Considering the abovementioned information, it is relevant to explore how important educational professionals consider a focus on semantic development of students with CDB within the context of outdoor activities.

Furthermore, it is relevant to explore what strategies are used by educational professionals to stimulate semantic development of students with CDB. Based on experience with outdoor activities with persons with CDB, Gibson (2019) describes that outdoor activities provide opportunities for language development, due to three inherent features of the outdoors: authentic/memorable experiences, shared experiences, and physically stimulating experiences. Furthermore, Gibson (2019) described strategies before, during, and after outdoor activities to optimise language development for persons with CDB. Table 1 gives an overview of the described strategies.

**Table 1**

*Strategies to Optimise Language Development*

Pre-activity	During activity	Post-activity
<ul style="list-style-type: none"> <li>• Preparation through scaffolding, by breaking the activity down in parts and focussing on required skills, knowledge, and communication.</li> </ul>	<ul style="list-style-type: none"> <li>• Frame an activity in narrative structure.</li> <li>• Mark significant moments, in tactile manner.</li> <li>• Engage in multiple activities centred around a common theme.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss an activity afterwards, in a structured or unstructured way.</li> <li>• Use signs and gestures meaningful to the person with CDB.</li> <li>• Make tactile art with objects relevant to the experience.</li> </ul>

*Note.* This table presents strategies, described by Gibson (2019), to optimise language development of persons with CDB through outdoor activities.

While Gibson (2019) outlines strategies for optimising language development during outdoor activities for persons with CDB, there is a lack of research on how schools implement these strategies. However, an alternative approach with potential benefits for language development during outdoor activities, that overlaps with the features and strategies described by Gibson (2019) is experience-based learning.

According to Andresen et al. (2000), experience-based learning supports a participative, student-centred approach, placing emphasis on direct engagement, rich learning possibilities and meaning-making (i.e., semantic development). Andresen et al. (2000) described an ultimate goal of experience-based learning, which is the students' own appropriation of knowledge that is personally significant and meaningful.

Additionally, Andresen et al. (2000) stated that experience-based learning cannot be reduced to an established educational approach with a set of strategies, but that it is possible to recognise characteristic principles and conditions that distinguish it from other approaches. Table 2 provides an overview of the principles and conditions for experience-based learning as identified by research (Andresen et al., 2000; Ballantyne & Packer, 2009; Fägerstam, 2013). These principles and conditions serve as foundational guidelines, though it is noteworthy that some elements may require adaptation to suit the specific needs and challenges of students with CDB during outdoor activities.

Exploring educational professionals' use of principles and conditions of experience-based learning, has the potential to give us insight into fitting educational approaches within the context of outdoor activities for students with CDB.

**Table 2**

*Principles and Conditions for Experience-Based Learning*

Principles	Conditions
Students personally engage in activities <sup>b c</sup>	Students' feelings are considered <sup>a c</sup>
Activities take place in a concrete, real-life, and local context <sup>b c</sup>	Students' intellect is considered <sup>a</sup>
There is an involvement of all senses during activities, such as residual hearing and sight, smell, taste, and tactile sense <sup>a b c</sup>	Students' values are considered <sup>a</sup>
Relevant life- and learning experiences are recognised and used during activities <sup>a</sup>	Control and autonomy of the students is considered <sup>a</sup>
The activities are structured and deliberately designed <sup>a 1</sup>	An equal relationship exists between student and educational professional <sup>a</sup>
The activities are a shared experience <sup>c</sup>	There is room for negotiation between student and educational professional <sup>a</sup>
The direct experiences of the students are articulated, communicated, and reflected upon during activities <sup>a c</sup>	Educational professionals respect the students <sup>a</sup>

Principles	Conditions
Students' self-directive potential is valued and pursued during activities <sup>a</sup>	Educational professionals validate the students <sup>a</sup>
The activities are reflected upon afterwards <sup>a</sup>	Educational professionals trust the students <sup>a</sup>
Learning outcomes of the activities are assessed <sup>a</sup>	There is a concern for student well-being <sup>a</sup>

<sup>a</sup> Andresen et al. (2000). <sup>b</sup> Ballantyne and Packer (2009). <sup>c</sup> Fägerstam (2013).

<sup>1</sup> According to Andresen et al (2000) this can include simulations, games, role-play, visualisations, group discussions, sociodrama and hypotheticals.

As previously mentioned, research on outdoor activities with persons with CDB is scarce, making it an interesting and relevant subject to explore. The findings of this current exploratory study, with regard to the aforementioned topics, can provide a base for further research. Finally, in practical terms, findings of the present study may offer practice-based examples from which schools can draw inspiration for the implementation of outdoor activities in their curriculum.

For this exploratory study, in accordance with the abovementioned information, three research questions were formulated:

1. What outdoor activities are being undertaken by educational professionals at schools with students with CDB?
2. How important do educational professionals consider a focus on stimulating semantic development of students with CDB during outdoor activities, and how do strategies applied in practice align with or differ from the described features and strategies found in the literature?
3. How important do educational professionals consider the use of experience-based learning during outdoor activities with students with CDB, and how are principles and conditions of experience-based learning, as described in literature, applied in practice?

## **Method**

### **Research Design**

For this exploratory research, a mixed methods approach was chosen, meaning that both qualitative and quantitative data was collected to answer the research questions. A mixed methods approach can enhance the validity and reliability of a study (Flick, 2018; Zohrabi, 2013). Through an online questionnaire, qualitative and quantitative data was collected to gain insight into undertaken outdoor activities, the focus on semantic development and applied strategies to stimulate semantic development, and the importance of using

experience-based learning and the application of principles and conditions during outdoor activities. Furthermore, through focus groups, additional qualitative data was collected, with the aim to gain more in-depth knowledge on the topics discussed in the questionnaire.

### **Participants**

Participants in this research were educational professionals working at schools that are specialised in education for students with deafblindness, located in geographically European countries. The motivation for an international research stems from the limited availability of schools specialising in the education of students with deafblindness. The exclusive focus on geographically European countries was due to feasibility, as these countries share similar or proximate time zones, enhancing communication and data collection processes.

To recruit participants, 18 schools were contacted through e-mail. The schools were sent an informed consent letter (Appendix A), an informed consent form for the questionnaire (Appendix B), an informed consent form for the focus group (Appendix C), and a recruitment poster (Appendix D). Schools were encouraged to share the information with their educational professionals. Furthermore, the research was shared on three Facebook platforms: 'Deafblind Education Network (DEN)', 'Deafblind International Research Network', and 'Outdoor Network, Deafblind International'.

Participants were encouraged to carefully read the provided information, and to contact the researcher in case of questions or remarks, before signing the informed consent form(s). Participants could participate in the focus group if they had completed the questionnaire first. Participation in the focus group was optional.

There were no selection criteria formulated for specifics regarding age, degrees of vision/auditory loss and socioeconomic background of educational professionals as well as students with CDB, to avoid limitation in sample size. The only inclusion criterium was that participants should have personally worked with at least one student with CDB, within the educational setting.

### ***Questionnaire***

The sample for the questionnaire included 19 educational professionals. Table 3 gives an overview of characteristics of questionnaire participants.

**Table 3***Characteristics of Questionnaire Participants*

Characteristic	Total n = 19
Age in years, range (M; SD)	25-58 years, (M = 44.6, SD = 8.4)
Identified as, n (%)	
Female	13 (68%)
Male	5 (26%)
Non-binary/Third gender	1 (5%)
Location school, n (%)	
Belgium	2 (11%)
Croatia	2 (11%)
Germany	3 (16%)
Greece	5 (26%)
The Netherlands	2 (11%)
Norway	3 (16%)
Sweden	1 (5%)
Switzerland	1 (5%)
Job position, n (%)	
Teacher	
General <sup>1 2</sup>	9 (47%)
Orientation, mobility, and daily living	1 (5%)
Outdoor activities and everyday skills	1 (5%)
Physical education	2 (11%)
German/religion/cooking/individual learning	1 (5%)
Head of department <sup>3</sup>	1 (5%)
Kinesiologist	1 (5%)
Psychologist	1 (5%)
Teachers assistant	2 (11%)
Work experience in years, range, (M; SD)	3-33 years, (M = 12.7, SD = 8.8)
Highest obtained level of education, n (%)	
Secondary education	1 (5%)
Vocational education	2 (11%)
University of applied sciences	1 (5%)
University Bachelor	4 (21%)
University Master	9 (47%)
PhD/Doctorate	2 (11%)
Participants' student information	
Number of students taught, range, (M; SD)	0-17 students, (M = 4.8, SD = 5.6) <sup>4</sup>
Total number of students, n <sup>5</sup>	91
Age range, n (%) <sup>6</sup>	
0-6 years	6
6-12 years	14
12-18 years	12
19+	4
Student cognitive delay, n (%)	83 (91%)
Student motor delay, n (%)	75 (82%)

*Note.* This table shows ranges, frequencies (n), mean values (M), standard deviation (SD), and relative frequencies (%) of certain characteristics of questionnaire participants. Relative frequencies (%) have been rounded to the nearest whole number.

<sup>1</sup> Teachers that did not teach a specific subject.

<sup>2</sup> One general teacher was also educational program coordinator.

<sup>3</sup> Head of department for a counselling centre for children and youth with deafblindness.

<sup>4</sup> One participant indicated that they previously worked with students with CDB, but not currently.

<sup>5</sup> Total number of indicated students. Educational professionals from the same school might educate the same students, causing overlap.

<sup>6</sup> Number of participants that indicated certain age ranges of their students.

## Focus Groups

In total, 12 educational professionals participated in the focus groups. Table 4 gives an overview of characteristics of focus group participants.

**Table 4**

*Characteristics of Focus Group Participants*

Characteristic	Total n = 12		
	Focus group 1 (n = 6)	Focus group 2 (n = 3)	Focus group 3 (n = 3)
<b>Location school, n (%)</b>			
Belgium		1 (8%)	
Croatia		2 (17%)	
Germany	2 (17%)		
Greece	1 (8%)		3 (25%) <sup>1</sup>
The Netherlands	1 (8%)		
Norway	1 (8%)		
Sweden	1 (8%)		
<b>Job position, n (%)</b>			
Teacher			
General <sup>2 3</sup>	3 (25%)	2 (17%)	1 (8%)
Orientation, mobility, and daily living			1 (8%)
Physical education	1 (8%)		
Outdoor activities and everyday skills	1 (8%)		
Head of department <sup>4</sup>	1 (8%)		
Kinesiologist		1 (8%)	
Teachers assistant			1 (8%)

*Note.* This table shows frequencies (n) and relative frequencies (%) of certain characteristics of focus group participants. Relative frequencies (%) have been rounded to the nearest whole number and relate to the total number of focus group participants (n = 12).

<sup>1</sup> Three participants from two Greek schools.

<sup>2</sup> Teachers that did not teach a specific subject.

<sup>3</sup> One general teacher was also educational program coordinator.

<sup>4</sup> Head of department for a counselling centre for children and youth with deafblindness.

## Procedure and Materials

### Questionnaire

Participants were asked to sign the informed consent form for the questionnaire beforehand. Upon receiving the signed form, a link to the online questionnaire was sent to the

participant. The questionnaire was conducted with Qualtrics (Qualtrics, Provo, version 2023), in English. Participants who expressed difficulties regarding reading and writing English, were allowed to involve a colleague to help. Two participants provided responses in Dutch, the native language of the researcher.

The questionnaire was divided into seven sections, namely: introduction, participant demographics, details of school/profession, outdoor activities, semantic development, experience-based learning, and end of questionnaire. There was a total of 37 questions, though not all questions were shown to each participant. Based on provided answers, participants were shown relevant questions or skipped irrelevant questions. A detailed overview of the questionnaire can be found in Appendix E. In the questionnaire, definitions were given for relevant concepts, such as outdoor activities, semantic development, and experience-based learning. At the end of the questionnaire, participants were given a random participant number, with the request to save it in case of withdrawal from the research.

### ***Focus Groups***

Participants were asked to sign the informed consent form for the focus group beforehand. Upon receiving the signed form, a list of suggested dates was e-mailed to participants to indicate their availability. Initially, two focus groups were scheduled, each including six participants. However, due to sudden unavailability of three participants in the second focus group, a third focus group was scheduled. The focus groups took place online through the meeting platform Zoom Video Communications (Zoom, version 2023) and were held in English. One participant who expressed difficulties regarding speaking English, was allowed to involve a colleague to aid by translating. Two participants were assisted by colleagues who also participated in the focus groups. For this reason, two focus group participants can seem overrepresented in this study, as they translated their colleagues' responses. Participants were e-mailed a link to the meeting, along with information regarding the use of Zoom Video Communications and an informational sheet regarding the topics that were going to be discussed (Appendix F). The focus groups were led by one moderator, the researcher. Table 5 gives an overview of the topic list with questions, used to guide the discussion. Audio-visual recordings were made of the focus groups, which participants consented to in the informed consent form.



**Table 5***Focus Group Topic List*

Topic	Sub-topic	Questions
Introduction	Please introduce yourself to the group.	Your name? Name school? Location school? Is school mostly deaf/blind/deafblind oriented? Job position at school? What is your favourite outdoor activity to do with your student(s) with CDB?
Outdoor activities	Importance of outdoor activities	How important do you think outdoor activities are, for students with CDB, within a school setting?
	Outdoor activities undertaken.	Which outdoor activities do you do with your students with CDB?
Semantic development	Importance of a focus on semantic development.	How important do you think it is to focus on stimulating semantic development during outdoor activities?
	Strategies to stimulate semantic development.	What strategies do you use in order to stimulate your students' semantic development during outdoor activities?
Experience-based learning	Importance of using experience-based learning	Do you think experience-based learning is important to use during outdoor activities with students with CDB?
	Use of principles and conditions of experience-based learning	In what way do you use experience-based learning during outdoor activities?
Wrap-up	Wrap-up question 1	Considering everything that was discussed today, what do you think is most crucial with regards to the implementation of outdoor activities in the school setting?
	Wrap-up question 2	Is there something you have not yet had the chance to discuss during this focus group, that you would like to address?

**Ethical Considerations**

Approval for the study was granted by the University of Groningen following the submission of the research proposal. As the research did not collect specific data from students and only included educational professionals, no consent was necessary from parents or legal guardians.

Educational professionals who participated in the questionnaire confirmed their participation and their consent to use their provided data in the research, before being able to access the online questionnaire. Educational professionals who participated in a focus group confirmed their participation and their consent to use their provided data in the research, before the focus groups took place. Along with the consent forms, additional information was provided regarding the research and participants were encouraged to ask questions, in order for them to make a well-considered choice about their participation.

Furthermore, names and other identifiable information were altered in the data and thesis to ensure anonymity of participants. Within the thesis, pronouns they/them are used regardless of the gender or number of participants. During the course of the research, collected data was stored on a password-protected device, that only the researcher had access to. After the research, data is stored a maximum of 10 years on a protected part of the server by the University of Groningen, which is only accessible to the first supervisor.

## **Data Analysis**

### ***Questionnaire***

Data from the questionnaire was exported from Qualtrics into a document compatible with IBM Statistical Package for the Social Sciences (SPSS statistics) version 28 (2021) and a document compatible with Microsoft Excel. In Microsoft Excel, qualitative data was separated from quantitative data, and transferred to Microsoft Word documents for coding.

**Quantitative.** Participants were asked, through a Yes/No/I don't know-question, whether they undertook outdoor activities with their students with CDB. There was complete unanimity among participants in response to this question. Therefore, no further analysis was necessary. Furthermore, participants were asked, through a Yes/No/I don't know-question, whether there was a focus on stimulating semantic development of students with CDB during outdoor activities. Data collected from this question was analysed by calculating the relative frequencies (percentages) of the given responses. Moreover, participants were asked, through a Yes/No/I don't know-question, whether they used experience-based learning during outdoor activities with students with CDB. Data collected from this question was analysed by calculating the relative frequencies (percentages) of the given responses.

Additionally, participants were asked to rate 20 statements, regarding the use of principles and conditions associated with experience-based learning, on a Likert-scale. The Likert-scale responses 'Strongly disagree', 'Somewhat disagree', 'Neither agree nor disagree', 'Somewhat agree', and 'Strongly agree', were respectively given the values 1-5 in

SPSS statistics. Subsequently, the mean, and the standard deviation were calculated for each statement through SPSS statistics.

Scale reliability for the statements was measured using Cronbach's coefficient  $\alpha$  in SPSS statistics, which measures internal consistency – the extent to which the items in a questionnaire measure the same construct (Taber, 2017). The value for Cronbach's coefficient  $\alpha$  for the 20 statements in the questionnaire was  $\alpha = .827$ , meaning the internal consistency of these statements was interpreted as sufficient (Taber, 2017).

**Qualitative.** Qualitative data from the questionnaire was analysed through directed qualitative content analysis, meaning that analysis through coding started with predetermined categories based on available theory and the research questions, and was later supplemented with a category that emerged from the data (Hsieh & Shannon, 2005). Relevant text fragments were coded using ATLAS.ti Windows version 23 (2023). Table 6 shows the codebook, with predetermined categories as well as one category that emerged from analysing qualitative data from the questionnaire, namely: 'Strategies unrelated to experience-based learning'. Relevant quotes were extracted from the data, and if necessary translated or enhanced, while remaining as close to the original intention as possible. Data from quotes was summarised to be presented in the results. Finally, the findings were compared with the available literature.

**Table 6**

*Codebook qualitative analysis*

Derived category	Emerged category	Derived sub-category	Definition
Outdoor activities		Undertaken outdoor activities	The outdoor activities that are undertaken by educational professionals with students with CDB.
Semantic development		Importance of a focus on stimulating semantic development	The indications of importance of a focus on stimulating semantic development of students with CDB during outdoor activities.

Derived category	Emerged category	Derived sub-category	Definition
		Strategies to stimulate semantic development	Strategies applied by educational professionals to stimulate semantic development of students with CDB during outdoor activities.
Experience-based learning		Importance of using experience-based learning	The indications of importance of the use of experience-based learning as an educational approach.
		Use of experience-based learning principles and conditions	The application of principles and conditions associated with experience-based learning by educational professionals during outdoor activities with students with CDB.
	Strategies unrelated to experience-based learning		Strategies applied by educational professionals during outdoor activities that diverge from the principles and conditions associated with experience-based learning, as outlined in this study, and do not specifically aim to stimulate semantic development in students with CDB.

### ***Focus Groups***

The audio-visual recordings of the focus groups were transcribed by the researcher, using intelligent verbatim transcription. For this research it means that the researcher omitted filler words such as “uhm” in the transcripts (McMullin, 2021). Non-verbal cues were included in the transcripts when relevant.

The transcripts were analysed through qualitative content analysis, using deductive coding, as no new categories emerged from the transcripts (Hsieh & Shannon, 2005). Relevant fragments from the transcripts were coded with ATLAS.ti, based on the predetermined codebook for the questionnaire, including the emerged category ‘Strategies

unrelated to experience-based learning'. Relevant quotes were extracted from the data, and if necessary translated or enhanced, while remaining as close to the original intention as possible. A selection was made of the most relevant quotes to present in the results section. Finally, the findings were compared with the available literature.

## **Results**

### **Questionnaire**

#### ***Outdoor Activities***

All 19 questionnaire participants answered 'Yes' to the closed question whether they undertook outdoor activities with their students with CDB. Furthermore, all participants responded to open questions regarding outdoor activities they undertook, which resulted in 63 activities that participants regard as outdoor activities. The five activities that were formulated as response by most participants were 'walking', 'going to the playground', 'sensorily experiencing the outdoor', 'contact with/riding horses', and 'gardening'. Other activities included sports-, sensory-, educational- and leisure activities, and excursions. A list of all activities is included in Appendix G.

#### ***Semantic Development***

**Importance of Stimulating Semantic Development.** Seventeen participants (89%) answered 'Yes' to the closed question whether they focus on stimulating semantic development of students with CDB during outdoor activities. Two participants (11%) answered 'No'. After coding qualitative data from the questionnaire, it became apparent, for one of these two participants, that emphasis was placed on the experience rather than stimulating semantic development due to severe cognitive limitations of the student with CDB.

In response to an open question about the goals of outdoor activities for students with CDB, six participants mentioned goals in their answer that are related to the stimulation of semantic development. These answers included: bigger signing vocabulary, conceptualisation, concept development, teaching of words and concepts and expanding vocabulary, understand connections, and understand concepts related to nature.

Furthermore, out of the 13 remaining participants, five participants responded that communication development in general was a goal of outdoor activities for students with CDB.

**Strategies Used to Stimulate Semantic Development.** A variety of strategies were filled in, in response to the open question about how participants stimulate semantic

development of students with CDB during outdoor activities. In total this resulted in 12 strategies.

First, five participants wrote ‘preparing the students for an activity’, as a way to stimulate semantic development. To do this, participants wrote that they prepare students by talking about the coming activity, through corresponding signing, gestures, words, objects of reference, tangible symbols, or pictograms. Additionally, participants wrote that they use a calendar to prepare students for coming activities.

Furthermore, four participants wrote ‘repetition’ of activities as a strategy to stimulate semantic development. Regarding this, one participant wrote that they go to the same places, so students have a better view on the activity that will take place.

Moreover, four participants answered that they give students ‘opportunities for sensory exploration’ to stimulate semantic development. For example, participants wrote that they allow students time, but also encourage them to explore during an activity through touch, smell, and taste.

Additionally, 11 participants answered that ‘naming concepts’, was done to stimulate semantic development. Participants responded that they provide signs, gestures, symbols, and words, to refer to activities or objects. Five participants wrote that they acknowledge, name, and talk about what students are doing, sensing, or feeling in the moment that it is experienced.

Furthermore, one participant responded ‘making connections across situations’, to stimulate semantic development. This participant wrote as an example: “Making connections with other situations from daily life. Wind outside and wind from the hairdryer, water from the rain and water in the bath”.

Moreover, five participants wrote ‘reflecting on- and/or reliving the experiences after the activity’ with the students, to stimulate their semantic development. One participant wrote about the use of a calendar box, discussion box, and language experience stories, to refer to previous experiences, but did not elaborate on these methods. Another participant answered that they focus on the physical experience during the activity, to use this in communication at a later time. One of the five participants wrote, in response to the open question about goals for the outdoor activities, that they provided a moment for the student to relive an experience, through imitating the activity outside the actual situation or talking about it.

Additionally, one participant wrote that the use of ‘gross motor activities’, as well as ‘offering activities in a narrative structure’, made it easier to reflect on or relive an activity.

They wrote that, when reflecting or reliving, the experienced movements can be repeated in the same narrative structure as the activity.

Furthermore, four participants responded that they made activities a ‘shared experience’ to stimulate semantic development of students with CDB. Participants wrote about doing this by engaging in activities together, having a shared focus, and letting students feel that they are both touching or experiencing the same.

Finally, other strategies written by participants included ‘offering choices’ during the activity (n = 1), ‘using motivating/emotionally loaded vocabulary’ during the activity (n = 1), and engage in activities ‘adapted to the needs’ of the students (n = 2).

### ***Experience-Based Learning***

**Importance of Using Experience-Based Learning.** Eighteen participants (95%) answered ‘yes’ in response to the closed question whether they used experience-based learning during outdoor activities with students with CDB. One participant (5%) answered ‘I don’t know’.

**Used Principles and Conditions of Experience-Based Learning.** Responses to the open question about how participants used experience-based learning during outdoor activities with students with CDB, included 12 out of 20 principles and conditions of experienced-based learning as described in the literature. Principles and conditions are described, sorted from most to least responded, below.

First, the principle ‘Students personally engage in activities’ was identified in 11 participants’ responses to the open question. Participants wrote that they aim for active engagement of students in activities, independently or with help. Moreover, one participant responded that they try to encourage students to engage in an activity by letting the students feel how the educational professional engages in the activity. Another participant wrote that they engage students personally by giving them certain responsibilities.

Furthermore, the principle ‘The activities are reflected upon afterwards’ was previously identified in five participants’ responses as a strategy used to stimulate semantic development. Two out of these five participants answered that they reflect upon the activity with students afterwards, in response to the open question about how they use experience-based learning. Two additional participants, in response to this question, wrote that they reflect on the activity by talking about the relevant experiences, and through the use of a tactile book based on the activity.

Moreover, the principle ‘There is an involvement of all senses during activities, such as residual hearing and sight, smell, taste, and tactile sense’ was identified in six participants’

responses to the open question. Participants wrote that they allow and encourage their students to use their senses during outdoor activities, to learn from-, to be stimulated by-, and to enjoy the activities.

Additionally, the principle ‘The activities are a shared experience’ was previously identified in four participants’ responses as a strategy used to stimulate semantic development. Two out of these four participants also wrote about shared experience during outdoor activities, in response to the open question about how they use experience-based learning. Two additional participants, in response to this open question, wrote about activities that indicate the presence of shared experience.

Furthermore, the principle ‘The direct experiences of the students are articulated, communicated, and reflected upon during activities’ was previously identified in five participants’ responses within the strategy ‘naming concepts’ to stimulate semantic development. Three out of these five participants also gave responses that indicate that they articulate, communicate, and reflect upon direct experiences of the students during the activity, in response to the open question about how they use experience-based learning. One additional participant, in response to this open question, wrote about taking a moment to get in touch with the student to explain what they are experiencing, but also about the use of haptics to give short messages in situations where elaborate signing is not possible – on a tandem or wheelchair bicycle.

Moreover, the principle ‘Activities take place in a concrete, real-life, and local context’ was identified in four participants’ responses to the open question. Three of the four participants formulated examples that were interpreted as activities taking place in a concrete, real-life, and local context, such as counting cones during bowling to enhance math skills, splitting wood for a fire during the winter period, and helping prepare and pack a lunch for a hike.

Additionally, the principle ‘The activities are structured and deliberately designed’ was identified in one participant’s response to the open question about how they use experience-based learning and in a second participant’s response to the open question about goals for the outdoor activities. The latter participant wrote that they deliberately create situations in which a goal can be worked on.

Furthermore, the principle ‘Students’ self-directive potential is valued and pursued during activities’ was identified in one participant’s response to the open question. This participant wrote about encouraging decision-making by the student. A second participant



wrote, in response to the open question about goals for the outdoor activities, that they take physical distance from a student to stimulate them taking their own initiatives.

Moreover, the condition 'Students' feelings are considered' was identified in two participants' responses to the open question. One participant responded that they try to excite the students to do an activity by making the experiences as positive as possible. The other participant wrote that they create experiences that give rise to certain feelings, to talk about afterwards.

Additionally, the condition 'Control and autonomy of the students is considered' was identified in two participants' responses to the open question. Participants wrote that they encourage students' independence and let them participate independently if possible.

Furthermore, the condition 'There is room for negotiation between student and educational professional' was identified in one participant's response to the open question. The participant formulated a situation regarding the initial refusal of a student to participate and the teacher allowing this by only letting the student feel the result of the activity, after which the student no longer refused to participate.

Finally, the condition 'There is a concern for student well-being' was identified in one participant's response. This participant wrote about ensuring the safety of students during activities.

When asked to rate the degree of agreement with statements regarding specific principles and conditions, participants appeared to agree relatively high with all. The degree of agreement with statements was calculated with SPSS statistics, where a mean-score of  $M = 5.00$  would mean that all participants indicated that they strongly agreed with the statement, whereas a mean-score of  $M = 1.00$  would mean that all participants strongly disagreed. The table in Appendix H shows the mean-scores and standard deviation for all principles and conditions.

Participants seemed to agree mostly with 'There is an aim to involve all the senses, such as residual hearing and sight, smell, taste, and tactile sense' ( $M = 5.00$ ,  $SD = .000$ ), 'There is an aim to take the students' feelings into account' ( $M = 5.00$ ,  $SD = .000$ ), and 'There is an aim to recognise and use students' relevant life- and learning experiences' ( $M = 4.95$ ,  $SD = .229$ ).

Participants appeared to agree the least with 'There is an aim to have an equal relationship between student and educational professional' ( $M = 4.53$ ,  $SD = .905$ ), 'There is an aim to have room for negotiation between student and educational professional' ( $M = 4.53$ ,

SD = .905), and ‘There is an aim to assess the students’ learning outcomes from the outdoor activities’ (M = 4.42, SD = 1.071).

## **Focus Groups**

### ***Outdoor Activities***

During the focus groups, participants were asked at one point which outdoor activities they undertook with their students with CDB. However, various activities were mentioned throughout the whole discussion. This resulted in 64 activities, which participants regard as outdoor activities. Five activities that were mentioned by the most participants were ‘gardening’, ‘sensorily experiencing the outdoor’, ‘going to the market’, ‘going to the supermarket’, and ‘going to a café’. Other activities included sports-, sensory-, educational- and leisure activities, and excursions. A list of all mentioned activities is included in Appendix G.

### ***Semantic Development***

**Importance of Stimulating Semantic Development.** Participants made interesting statements during the focus groups when asked if they find a focus on stimulating semantic development of students with CDB important during outdoor activities.

Four participants indicated that stimulating semantic development is a goal during outdoor activities and that everything they do is connected to communication.

*[P8] ‘I would say it's a crucial thing of what we basically want from the outdoor activities when they are included in the schedule’.*

Some participants stated that they find the focus on stimulating semantic development imperative to undertaking outdoor activities.

*[P10] ‘There is no meaning to have an outdoor or any activity without the focus on semantic development. The connection with the meaning, it's our starting point at every activity, whatever it is, indoor or outdoor activity...So the focus on semantic development is our main focus’.*

It was also mentioned that the outdoor environment more easily facilitates the stimulation of semantic development, than indoor, due to its authenticity.

*[P1] ‘Outdoor gives a more authentic, easier way to give meaning to signs’.*

One participant mentioned that they think outdoor activities should be taken up in the curriculum as a method to stimulate semantic development.

*[P8] 'I believe it's important to put a focus on the outdoor activities as a powerful or important framework for semantic development. So, I think this is really important to think about, to be included in the curriculum'.*

**Strategies Used to Stimulate Semantic Development.** When asked about how they stimulate semantic development of their students with CDB during outdoor activities, participants provided various answers. Ten strategies, used by participants to stimulate semantic development, became apparent after analysis of the coding of the focus group transcripts.

First, four participants indicated 'preparing the students for an activity' as a strategy to stimulate semantic development. Participants mentioned doing this through signing and providing relevant symbols.

*[P11] 'Even going to the open market, we're not taking the student, let's go. We're giving him a symbol that's about the open market, probably a paper bag that we used at the open market. We make the sign for the open market... They are prepared and they make the connection with every activity'.*

To prepare students one participant mentioned the use of language experience stories, which present the narrative structure of an activity, and memory books, with collected tangible references to the activity. Both were also mentioned to be used to reflect on activities, which is described as a strategy later.

*[P8] 'Then we also use these language experience stories, which is basically the sequence of any given activity. So you can refer to it when you are having a conversation about this activity...So this is also a way to, help to sort out, to organise the experience that they have that we can refer to. Having something more tangible that you can refer to. The memory books and things like that, that you can refer to the experience to help them to make a connection, to talk a lot about it before the experience itself as you can prepare him'.*

Furthermore, seven participants mentioned 'repetition' of activities as a strategy to stimulate semantic development. Participants stated that they repeat certain activities more often, consistently. Some participants also mentioned repeating certain activities by connecting them to seasons, or weekdays.

*[P5] 'We also try to have traditions that you do several times...In the spring we plant a lot, and we have these traditions with a summer party outside. And in the autumn, we clean the garden and the schoolyard together, all the students in the school. And you do that every year, the same'.*

Moreover, eight participants stated using 'real and full experiences' as a strategy to stimulate semantic development. Participants mentioned that personally gaining experiences in real situations is necessary.

*[P3] 'I feel that it's a great opportunity, all these activities, to give the children the opportunity to go outside of the walls of their house or of their classroom and see the real world'. [P4] 'That's important for building concepts of the world. How big is something? How does it feel? How far is this?'. [Moderator] 'To get a real feel of the world, to understand it?'. [P4] 'Yes, authenticity leads to a real concept, a more real concept'.*

Participants also mentioned the importance of a full experience of a single concept, by providing various experiences related to the concept.

*[P10] 'For example, the apple. We're going to buy that from the market or the supermarket, we're going to the educational kitchen and slice it, cook it, taste it, smell it, and we're going to the tree and pretend that it's an apple tree so we can pick it from there...So, the whole experience has a meaning to build a concept'.*

Additionally, two participants indicated giving students 'opportunities for sensory exploration' as a strategy to stimulate semantic development, through touch, smell, and taste. One participant mentioned doing this while learning a certain route.

*[P8] '...learning what we need to pass and to really explore the way. Much of the effort is given so that the child is really involved, not taken through the activity, but really to feel all the things on the way'.*

Furthermore, four participants mentioned 'naming concepts' that were experienced during activities as a strategy to stimulate semantic development. Participants indicated that it is important to do this during the experiencing of the concept.

*[P7] 'When there's a lot of sun, I hold one moment to take his hand and talk to him. It's the sun, it's hot. So, you can link it together. Also, the wind. Sometimes when there*

*is this gust of wind. Then I also I stop the walk and then I try to tell my student, it was wind'.*

Moreover, one participant stated that 'making connections across situations' is a strategy to stimulate semantic development, for example by relating an indoor- to an outdoor experience.

*[P7] 'Sometimes we have to blow-dry his hair with a hairdryer. So that's also wind. So that can be told, it's the wind again. So, we tried to make the connection between outside and indoor language'.*

Additionally, one participant mentioned that 'paying attention to a reaction of understanding' of the student was important when naming a concept, for example by reading body language.

*[P7] 'Trying to look at his reaction to see if he understands what we say, because most of the time, he doesn't give some recognition of, yes, I understand it. We have to read his body language'.*

Furthermore, six participants indicated that 'reflecting on the experiences after the activity' was a strategy to stimulate semantic development. One participant mentioned going to the same location to reflect on an experience. A different participant indicated the use of the previously mentioned language experience stories and memory books, but also a conversation/discussion box, with tangible references to the activity.

*[P8] '...but also after by collecting things from the activity and putting it into the box or book or conversation or discussion box... '.*

Another participant stated that, to reflect on the activity, it was important to recognise the meaningful experiences for the student. This participant also indicated that it is important to emphasise these experiences, imitating them using big gestures.

*[P4] 'I think what's very important is to recognise what is meaningful for the child with deafblindness because sometimes it's totally different from things that I've got planned. ...and then also to make a big deal out of it...to imitate and make big gestures'.*

Moreover, three participants mentioned 'shared experience' as a strategy to stimulate semantic development. One participant specifically mentioned that shared experience was

important to be able to reflect on the activity, by letting the student feel that the educational professional is experiencing the same thing.

*[P6] 'I think the most important thing is that the deafblind person feels that I feel the same. Because that's the beginning to talk about it...'*

Finally, four participants stated that, when reflecting on- or preparing for an activity, a 'consistent use of experience relevant objects, signs or gestures' is a strategy to stimulate semantic development. One participant mentioned to coordinate this with colleagues.

*[P7] 'Also, asking colleagues to do it the same way, because I'm only working some hours with my student and then a colleague takes over. So, we try to do it in the same manner'*

Another participant also indicated the use of natural signs, rather than formal sign language, as these can be more relatable to students' actual experiences. This participant stated that accepting and using a student's natural signs, rather than planned formal sign language, can give the student their actual voice in a conversation.

*[P1] 'So in these activities you can make signs that are natural signs and not traditional signs from the sign languages...Because in a planned activity, I will plan the signs and it's not natural anymore. It's not a conversation. It's only me talking, but we are not talking to each other'*

### ***Experience-Based Learning***

**Importance of Using Experience-Based Learning.** Participants made interesting statements during the focus groups when asked if they find the use of experience-based learning important during outdoor activities.

Five participants stated that experience-based learning is virtually the only way they feel that they can teach students with CDB, outdoor but also indoor. In addition, two participants have mentioned that their work with students with CDB is always experience-based.

*[P1] 'I think there is no other way, because the congenital deafblind students have to experience the activity. I cannot teach the concept from a paper, they have to feel the concept that I'm trying to teach, and it can only be taught if it's felt...Everything that I do is experience-based learning with a deafblind child not just outside even inside'*

Furthermore, several participants indicated that they find it easier to facilitate experience-based learning outdoors due to its experiential and stimulating nature, and that this is also part of the reason they choose to undertake outdoor activities.

**Used Principles and Conditions of Experience-Based Learning.** Fourteen out of 20 principles and conditions of experience-based learning were identified within the transcripts of the focus groups. These principles and conditions, as well as relevant quotes, are described below, sorted from most to least mentioned.

First, the principle ‘The activities are reflected upon afterwards’ was previously identified in six participants’ responses as a strategy to stimulate semantic development. No additional participants mentioned this principle, however it was also mentioned outside the context of stimulating semantic development. Two participants stated that they used a physical experience of the student, which was memorable, to refer to the activity during which it was experienced, though this physical experience was not exactly part of the activity.

*[P9] ‘We planned to do a sport activity in the park, and when we arrived it started raining. It was very funny, because our student was very happy to feel the rain on their skin, I think maybe it was a first experience of rain...’. [P8] ‘...this rain was an important experience for this event...rain came, and you could refer to it later’.*

Furthermore, the principle ‘The activities are a shared experience’ was also mentioned as a strategy to stimulate semantic development by three participants. Outside the context of stimulating semantic development, it was expressed to be used by three additional participants. Participant 4 mentioned the following:

*[P4] ‘I wanted to add that you are in a state of co-presence in the activity, like joint attention’.*

Moreover, the principle ‘Students personally engage in activities’ was identified in five participants’ responses. Participants stated that the students have to experience by personally engaging in activities, in order to learn, because otherwise it will have no meaning.

*[P6] ‘You have to have experience. And it's the best thing to learn also for people who are not deafblind. But it's very important for those who are deafblind’.*

Additionally, it was indicated that participants make an effort to involve the students in the whole activity, rather than taking them through an activity.

Furthermore, the principle ‘Activities take place in a concrete, real-life, and local context’ was identified in five participants’ responses and examples. Participants indicated that real-life experiences are important and that outdoor naturally feels more real and authentic, making it an ideal setting for activities based on a concrete, real-life and local context. Participant 10 gave a relevant example:

*[P10] ‘...we took that opportunity just for students to have the experience of being in a boat. Touch the water a little bit, feeling the shake of the boat. And then it was much more easy and it made sense to them that that's what we're going to play in our part in our theatre, pretending that we are in a boat. That's what a boat is’.*

Moreover, the principle ‘There is an involvement of all senses during activities, such as residual hearing and sight, smell, taste, and tactile sense’ was identified in five participants’ responses. Participants explained that the outdoor is naturally sensory stimulating, and that they want to ensure that their students take in as much sensory information as possible.

*[P1] ‘Plus it's full body so they can feel the wind and the light and the sun. So, for my students, I think it's like a complete full body sensory experience...’.*

*[P5] ‘It's nice, the smell is nice. Even if you can't taste or eat, you can sense the smell and the warmth’.*

Additionally, the principle ‘Relevant life- and learning experiences are recognised and used during activities’ was identified in three participants’ responses. Participants expressed that they consider their students’ previous experiences to build on them and offer new experiences.

*[P1] ‘I'm going to start small with the fire. Introduce the concept, because I think they have never even seen fire or felt fire. They have felt the heat probably, so I have to talk to the parents if they have any experience with the fire’.*

Furthermore, the principle ‘The direct experiences of the students are articulated, communicated, and reflected upon during activities’ was previously identified in three participants responses as the strategy ‘naming concepts’ to stimulate semantic development. One participant, outside the context of stimulating semantic development, mentioned that they relate important aspects to the direct experiences of the students, such as the need for certain clothes based on the weather.



*[P8] ‘...when the weather is bad, this is an important opportunity to discuss this physical experience, how when it’s windy you need to dress like this and when it’s sunny, I don’t need as much clothes...’.*

Moreover, the principle ‘The self-directive potential is valued and pursued during activities’ was identified in three participants’ responses. Participants stated that they think it is important for students to develop self-advocacy. One participant expressed that they think it is important to facilitate student decision-making, by having the outdoor space for students to choose to go outside, but also to allow certain decisions made by students.

*[P7] ‘So, our pupils could decide for themselves, now I want to go outside...it’s very important that there is a lot of green space so that they can choose themselves to go outside when they want to go’.*

Additionally, the condition ‘Students’ values are considered’ was identified in three participants’ responses. Participants said they take the student’s preferences, interests, and personality into consideration.

*[P3] ‘And to take their interests and their personality into consideration, because not all people are for everything, and they don’t like everything’.*

Furthermore, the condition ‘There is a concern for student well-being’ was identified in three participants’ responses. Participants described the importance of the students’ safety. Participant 4 also indicated occasional worries:

*[P4] ‘...when you think outdoors and maybe sports with children with deafblindness, you are so cautious and think, oh, I hope nothing will happen’.*

Moreover, the principle ‘The activities are structured and deliberately designed’ was identified in two participants’ responses. One participant stated that they structure activities according to the students preferences. The other participant mentioned that the activities are deliberately designed to have a meaning and fulfil a goal. This participant also mentioned the use of role play as preparation.

*[P10] ‘For example, we may make a scenario in the classroom, playing roles or making a drama play for what we’re going to have outside the school at the outdoor activity, so that the students may be prepared for what they are going to be confronted with’.*

Contradictory to this finding, two participants in the focus groups also described the nature of the outdoor activities to be unplanned and flexible, and requiring less preparation to make activities more sensory stimulating.

*[P4] 'I think outside you can't plan everything. So, I think you get more flexible, you experience new things, you have to go more out of your comfort zone because there's no structure'.*

Additionally, the condition 'Control and autonomy of the students is considered' was identified in two participants' responses. Participants expressed that they see their students become more autonomous. One participant described the process of stimulating students' autonomy.

*[P2] 'I take the children through all the steps they have to do. And by doing this many times the children will take it over and she will lead, or he will lead, and I will be there. And sometimes they can do it by themselves, step by step'.*

Furthermore, the condition 'Students' intellect is considered' was identified in one participant's response. They mentioned that the degree of preparation depended on the student's existing abilities and knowledge.

*[P11] 'Also, it depends on the student. What are the abilities? What knowledge? What level of knowledge?'*

Finally, the condition 'Educational professionals trust the students' was identified in one participants' response. This participant mentioned mutual trust is important.

*[P5] '...that you have a good relation to the student and they can have faith in you and you can trust each other. That's the first step'.*

### **Additionally Mentioned Strategies**

Participants mentioned three additional strategies that they did not relate to the stimulation of semantic development and were not present within the literature regarding principles and conditions of experience-based learning.

The first strategy was to 'consider the students' comfort zone' during outdoor activities. Three participants indicated that it is important that the students feel safe with them. One participant gave the example of attuning to the student, and to know when to stop.

*[P1] '...so that I don't lose trust by doing an activity that they are not prepared for or that they feel scared. That I'm really attuned to when to stop, when I think it's too much or they need help because they cannot communicate in traditional ways'.*

Another participant indicated that patience is an important factor for this.

The second strategy was to 'include others' during outdoor activities. Three participants indicated that they find it important for students to be aware of persons other than the educational professional during the outdoor activities.

*[P8] 'It should never be with only one person, the main caregiver or the teacher, but also what can I do so the child is more aware of the peer, or this waiter, or the woman who works in the store...understanding there is another person doing the same even if they cannot communicate between each other because they don't have a shared communication'.*

One participant expressed that they try to stimulate this, as they found it can affect students' willingness to participate.

The third strategy, mentioned by two participants, was to 'provide a variety of (new) experiences' during outdoor activities. Participant 2 gave an example:

*[P2] '...but also you have to give them a lot of different activities...And you can make some food on a fire. But we don't make one food, we make four different foods...So a lot of different things we give them'.*

## **Discussion and Conclusion**

### **Discussion**

The purpose of this study was to obtain insight into outdoor activities at schools with students with CDB, in a European international context. Firstly, there was an aim to explore which outdoor activities are undertaken (research question 1). Secondly, there was an aim to explore whether educational professionals consider a focus on the stimulation of semantic development of students with CDB during outdoor activities important, and to compare and contrast strategies applied by educational professionals to stimulate semantic development with existing literature (research question 2). Thirdly, there was an aim to explore whether educational professionals consider the use of experience-based learning important, and how principles and conditions of experience-based learning, as found in literature, are used by educational professionals during outdoor activities (research question 3).

In this discussion findings from both the questionnaire and focus groups are combined and discussed per research topic.

### ***Outdoor Activities***

In total, a wide variety of 85 activities were identified within the questionnaire and the focus groups. This included various sports-, sensory-, educational- and leisure activities, and excursions. Similarities were found between the activities identified in the current study and the identified activities by Gibson and Heineman (2020). A list of all mentioned activities is included in Appendix G.

Some activities that were indicated may not typically be classified as outdoor activities, as they do not take place outdoor. This included activities such as going to the bakery, going to church, going to the hairdresser, going to the library, going to the museum, going to the supermarket, going to the theatre, shopping, visit the pedagogical university, and visit the police academy. An explanation for this could be that participants misinterpreted outdoor activities as activities outside the school environment. The researcher tried to avoid this by providing a definition of outdoor activities, and explicitly emphasising the aspect of activities taking place outdoor. Nonetheless, these activities were still mentioned.

From the questionnaire and focus groups it became apparent that educational professionals who mostly indicated these activities, all worked at schools located in cities, with little natural outdoor space. As these educational professionals do not have the facilities to offer many activities that fully take place outdoor, they might have resorted to activities that are relevant within their local environment and are able to give students relevant experiences and learning opportunities. A post-conclusive literature search found that the mentioning of these unconventional outdoor activities could relate to place-based outdoor learning, which uses the locally relevant outdoor context to offer learning opportunities (Lloyd et al., 2018). It is important to acknowledge that, within the focus group, participants who worked at schools located in the city, might also have been overrepresented (n = 7).

Another reason for the inclusion of indoor activities lies in the educational potential of combining indoor with outdoor activities. Educational professionals sometimes choose to combine indoor activities with outdoor activities, as a way of approaching a concept from different angles and providing a complete experience for the students. Educational professionals, for example, combined indoor activities such as going to the supermarket and cooking in the kitchen, with outdoor activities such as gardening and picking fruit from trees, to teach the concept of certain fruits and vegetables. This relates to one of Gibson's (2019) described strategies, to engage in multiple activities centred around a common theme.

Furthermore, this link between indoor and outdoor learning was also described by Fägerstam (2013).

### ***Semantic Development***

**Importance of Stimulating Semantic Development.** Data from the questionnaire and the focus groups suggests that most educational professionals focus on stimulating semantic development in students with CDB during outdoor activities.

Participants not only stated that the stimulation of semantic development is a goal when undertaking outdoor activities, but also that it is imperative to the outdoor activities themselves. Furthermore, one participant stated the opinion that outdoor activities should be seen as a “powerful or important framework for semantic development”, which should be included in the school’s curriculum. Additionally, participants mentioned that, as opposed to indoor, the outdoor environment more easily lends itself to stimulate semantic development, due to its authenticity.

Overall, these findings suggest that educational professionals consider a focus on stimulating semantic development of students with CDB, during outdoor activities, relatively important. The fact that most educational professionals indicate a focus on semantic development during outdoor activities, might suggest that positive results on semantic development are seen in practice within the educational setting. This would support existing literature, which suggested that outdoor activities can facilitate the stimulation of language development of persons with CDB (Gibson, 2000, 2005, 2019; Gibson & Nicholas, 2017; Gibson et al., 2020).

**Strategies Used to Stimulate Semantic Development.** In total, 15 strategies, that educational professionals use to stimulate semantic development during outdoor activities, were identified in qualitative data from the questionnaire and the focus groups. The table in Appendix I gives an overview of all identified strategies and their practical implementation, as described in the results.

Eight of the identified strategies can be related to the features of outdoor activities and strategies described by Gibson (2019). These eight strategies are described below.

First, participants expressed offering activities in an authentic setting as well as using multiple activities to teach about one concept within the strategy ‘offer real and full experiences’. Additionally, participants described offering activities in a narrative structure. Furthermore, participants described that they offer ‘gross motor activities’ and ‘opportunities to sensorily explore’. Moreover, participants describe that they ‘make activities a shared experience’. Furthermore, for ‘reflecting on and/or reliving an activity afterward’,

participants described the importance of recognising meaningful experiences for the student. Additionally, participants indicated that they ‘use experience relevant signs, gestures, and objects’, meaningful for the student. Finally, Participants described ‘preparing students before an activity’, though the use of scaffolding, as mentioned by Gibson (2019), was not identified in the data.

The remaining seven strategies identified in this study are supplementary to what Gibson (2019) described. Nonetheless, it is important to acknowledge that this study might still not have found the complete scope of strategies used to stimulate semantic development, and that other strategies could exist.

Finally, it is notable that five described strategies, such as ‘offer real and full experiences’, ‘opportunities for sensory exploration’, ‘name concepts’, ‘reflect on- and/or relive the experience after the activity’, and ‘make activities a shared experience’, are similar to the principles and conditions of experience-based learning. This might suggest that certain aspects of experience-based learning could be useful to stimulating semantic development during outdoor activities.

### ***Experience-Based Learning***

**Importance of Using Experience-Based Learning.** Data from the questionnaire and the focus groups suggests that most educational professionals indicate that they use experience-based learning during outdoor activities with students with CDB.

Participants stated that, unrelated to outdoor activities, experience-based learning is the most prominent method of learning for students with CDB, to compensate for the dual sensory impairment of sight and hearing. Furthermore, participants stated that experience-based learning is more easily facilitated during outdoor activities, due to the authentic, experiential nature of the outdoor environment. Related to this, participants stated that, the fact that experience-based learning is more easily facilitated outdoors, is partly the reason they undertake outdoor activities. This finding supports the suggestion that outdoor schooling facilitates experience-based learning, as described by Fägerstam (2013).

Overall, these findings suggest that educational professionals consider the use of experience-based learning, during outdoor activities, relatively important. An important sidenote is that educational professionals might have had their own definition of experience-based learning, unrelated to the principles and conditions that were found in the literature. When discussing the importance of the use of experience-based learning, participants might have not considered these principles and conditions. The researcher made efforts to avoid

this, by providing an informational sheet including, among other information, the definition of experience-based learning as well as the corresponding principles and conditions.

**Used Principles and Conditions of Experience-Based Learning.** In total 16 out of 20 principles and conditions of experience-based learning, as described in the literature (Andresen et al., 2000; Ballantyne & Packer, 2009; Fägerstam, 2013), were identified in qualitative data from the questionnaire and the focus groups. The table in Appendix J gives an overview of all identified principles and conditions of experience-based learning and their practical implementation, as described in the results.

Contradictory to the identified principle ‘The activities are structured and deliberately designed’ (Andresen et al., 2000), participants also stated that the outdoor environment facilitates unplanned activities, as less preparation is necessary to make outdoor activities sensory stimulating than for indoor activities. As this principle was still identified in other statements of participants, this finding might suggest that educational professionals find both planned and unplanned outdoor activities meaningful for their students with CDB. Relating to this, a post-conclusive literature search found that both planned and unplanned activities can have various developmental benefits for students (O’Gorman, 2019).

The four principles and conditions that were not identified within qualitative data were ‘Learning outcomes for the activities are assessed’, ‘An equal relationship exists between student and educational professional’, ‘Educational professionals respect the students’, and ‘Educational professionals validate the students’. Despite a relatively high degree of agreement on all statements regarding each principle and condition of experience-based learning in the questionnaire, it is remarkable that not all principles and conditions were identified in qualitative data. A possible explanation for this, may lie in the fact that practical examples for these four principles and conditions are difficult to express, or that they are less applicable within the outdoor activities for students with CDB.

It is noteworthy that indicated strategies to stimulate semantic development had overlap with- but also supplemented the principles and conditions of experience-based learning as described in the literature. This suggests that experience-based learning as described in the literature, does not fully encompass the wider range of educational strategies applied during outdoor activities.

Finally, as the existing literature on experience-based learning outdoor is relatively limited, and experience-based learning is not yet recognised as an established educational approach (Andresen et al., 2000), it is important to acknowledge that additional principles and conditions might exist on top of the ones identified in the introduction of this study.

### ***Additionally Mentioned Strategies***

Within the data, some additional strategies, unrelated to principles and conditions of experience-based learning, and which were not indicated as strategies to stimulate semantic development, were identified. These additionally identified strategies included ‘considering students’ comfort zone’, ‘including others’, and ‘providing a variety of (new) experiences’ during the outdoor activities.

While these strategies share some similarities with the principles and conditions of experience-based learning, they do not exactly align, as they bring unique perspectives different from what is discussed in the literature. This, again, suggests that experience-based learning as described in the literature, does not cover the complete spectrum of educational strategies applied during outdoor activities.

### **Strengths and Limitations**

This study presents several strengths and limitations that warrant consideration. A strength of this study was the choice for a mixed method approach, as this can enhance the validity and reliability of a research (Zohrabi, 2013). Furthermore, the validity was enhanced by the choice for within-method triangulation, meaning the combination of different methodological approaches to obtain qualitative data (Flick, 2018). Finally, through correspondence between the researcher and both supervisors the transparency of this study was assured.

The used methods of this research also have their limitations. Participants might have given socially desirable responses to both the questionnaire and the focus groups. Efforts were made to avoid this within the questionnaire, by reassuring participants that the given responses could not be traced back to them. Furthermore, while participants may have described the use of certain strategies, it is important to acknowledge the possibility that their self-reported practices may not precisely align with the actual practice.

There is also a possible limitation regarding a questionnaire measurement error. Language barriers stemming from the international nature of the study could have resulted in the questionnaire being misunderstood, affecting the accuracy of the intended construct measurements.

An additional limitation arises from the fact that the researcher also served as the moderator in the focus groups. This dual role may have influenced participants’ responses during the discussions. However, it is worth noting that this limitation does not affect the questionnaire data due to the chosen mixed-method approach and triangulation.



Another limitation of this study was its relatively small sample size, which constraints the generalisability of the findings. A reason for this could be the timing of the recruitment; before, during, and after the summer vacation. Another reason for this could be a language barrier, as the research was mostly conducted in English. This language restriction might have deterred educational professionals, who did not feel sufficiently proficient in this language, from participating.

Moreover, another limitation concerns a possible sample bias, further impacting the generalisability of the findings. Educational professionals who do not undertake outdoor activities with their students with CDB or who believe there are no educational benefits to outdoor activities, might have deliberately chosen not to participate.

Finally, the study acknowledges a potential coding bias in the analysis of qualitative data, as this was only coded by the researcher. The study's outcomes are based on subjective interpretations by the researcher and might be perceived differently by others.

### **Conclusion and Recommendations**

In conclusion, educational professionals from different countries, engage in a variety of 85 outdoor activities with students with CDB. The interpretation and implementation of these outdoor activities differ depending on available space and facilities.

Furthermore, a focus on stimulating semantic development during the outdoor activities is deemed relatively important by educational professionals. Fifteen strategies used before, during and after outdoor activities, to stimulate semantic development, were identified. Eight strategies align with existing literature (Gibson, 2019), while the remaining seven are supplementary. Five strategies coincide with principles and conditions of experience-based learning.

Moreover, the use of experience-based learning during outdoor activities with students with CDB is considered relatively important by educational professionals. Sixteen out of 20 principles and conditions, from existing literature (Andresen et al., 2000; Ballantyne & Packer, 2009; Fägerstam, 2013), were identified to be used by educational professionals. It is noteworthy that the literature's principles and conditions of experience-based learning do not encompass all strategies applied during outdoor activities.

Despite the limitations, the findings of this exploratory study can be seen as a valuable foundation regarding the implementation of outdoor activities with students with CDB within the educational setting, upon which future research can build.

Further research is recommended to compare, contrast, and supplement the current findings. Future research can focus on further exploring applied strategies to stimulate

semantic development and the role of experience-based learning during outdoor activities with students with CDB.

Additionally, to address certain limitations identified in the current research, future research could consider methodological refinements. In the future, observational research could be employed to objectively identify the actual implementation of outdoor activities and strategies in practice. Moreover, future research could entail correlational studies, to measure the effect of strategies or outdoor activities on semantic development of students with CDB. Although international research, as conducted in the current study, can uncover a diverse range of perspectives to build a foundation for further research, national research could be more feasible when considering observational and correlational studies.

Finally, it is proposed that future research could explore all applied strategies, related to the stimulation of various developmental areas, during outdoor activities, with the aim to assemble a complete set of strategies and potentially form an independent educational approach for students with CDB.

A recommendation for practice is to regard the findings of the current study as a collection of educational professionals' experiences, from which inspiration for the implementation of outdoor activities can be drawn. It is, however, important to consider that the findings lack correlational evidence. While various outdoor activities and strategies were identified, their effectiveness within the educational setting remains uncertain, and their suitability for use has not been determined.

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## Appendices

### Appendix A. Informed Consent Letter

#### Informed Consent Letter

##### Outdoor activities at schools for children with congenital deafblindness

Dear reader,

Thank you for your interest in participating in this research. This letter explains what the research entails and how the research will be conducted. Please take time to read the following information carefully. If any information is unclear, kindly ask questions using the contact details of the researcher or supervisors provided at the end of this letter.

#### **What is this study about?**

This study involves exploratory research regarding outdoor activities for children with congenital deafblindness at school. With outdoor activities, this study means any activity that is done outdoors at school.

This research aims to see which outdoor activities are being done with the children at schools in different geographically European countries. The research also aims to see what is being done to engage children with congenital deafblindness in these activities and foster their learning experiences and if there is a focus on stimulating the child to learn to connect meanings to words/concepts, also known as ‘semantic development’, during outdoor activities.

The research is carried out by Kayleigh Janinke Pater, Master student of the Deafblindness programme at the Department of Pedagogical Sciences at the University of Groningen, The Netherlands. The research is supervised by Prof. Dr. Saskia Damen and Dr. Joseph William Gibson.

#### **Participants**

You have been invited because your practical knowledge is valuable to this research. The study aims to recruit at least 20 educational professionals, from schools with children with congenital deafblindness, to participate in a questionnaire (in English). The study aims to recruit at least 10 educational professionals, who participated in the questionnaire, to also participate in a focus group. Due to time limitations, at this stage of the research, the



researcher is only interested in participants working at schools in geographically European countries.

**What does participation involve?**

Participating in this study involves answering an online questionnaire using Qualtrics (Qualtrics, Provo, version 2023). Participating in the questionnaire will take approximately 20 minutes. This questionnaire is written in English and textual responses by you should also be provided in English. Data from the questionnaire is anonymous and the responses cannot be traced back to you individually by the researcher. Data from this questionnaire will be analysed through the IBM Statistical Package for the Social Sciences (SPSS statistics) version 28 (2021).

Additionally, this study would like to invite you to participate in a follow-up focus group. Participation in the focus group is only possible if you participate in the questionnaire. You can also choose only to participate in the questionnaire.

During the focus group, you will be asked to talk about outdoor activities at your school. The researcher will have a list of topics to guide the discussions. The focus group will take place online in a group with up to 6 other educational professionals. This focus group will take approximately 90 minutes. The focus group will take place through the online meeting platform Zoom Video Communications (Zoom, version 2023). Audio as well as video will be recorded during the focus group. A written transcript will be made from the recorded focus group. The transcript will be analysed using ATLAS.ti Windows version 23 (2023). Data you provide in during the focus group will be anonymously incorporated in the thesis.

**Do you have to participate?**

Participation in this study is voluntary, you are not in any way obliged to take part in it. If you chose to participate in this study but no longer want to, you can withdraw during the period of data collection, which ends October 2023. You do not need to provide reasons for withdrawing. You can withdraw by contacting the researcher, using the contact details provided at the end of this letter.

**Are there any risks in participating?**

There are no risks involved in participating in this study.

**Are there any benefits to participating?**

This research will not directly benefit you. This research may contribute to further knowledge of outdoor activities for children with congenital deafblindness at school. The outcomes of the research could be informative to schools with children with congenital deafblindness.

### **How will the information you provide be recorded, stored, and protected?**

Information you provide in the questionnaire will be collected through the questionnaire-program, Qualtrics. Information you provide during the focus group will be audio- and video-recorded in the meeting program Zoom. Information that you provide will be stored on a password-protected device. Only the researcher will have access to this data.

The information you provide will be processed for the strict use of the educational purpose of writing a Master thesis. The information you provide will be anonymously incorporated within the thesis. Any identifiable features that could link you to this study will be removed. Within transcriptions of the focus group your name will be replaced with a letter that is not linked to your initials. In the event of any publication or presentation from the research, video- and audio-recordings as well as personally identifiable information will not be shared. The data will be stored for a maximum of 10 years on a protected part of the server by the University of Groningen, which is only accessible to Prof. Dr. Saskia Damen.

### **What will happen to the results of the study?**

The results of the study will be described in a Master thesis and stored in the online library of the University of Groningen. The findings within the Master thesis will additionally be presented in an oral presentation.

### **Informed consent**

If you agree to participate in this study, please sign the informed consent form(s). Signing the informed consent form(s) means that you have the intention to participate in the study, but you will still be able to withdraw until the end of the data collection (October 2023).

### **Who should you contact for further information?**

You may always ask questions about the research, now, during the research, and after the end of the research. Contact information for the Master researcher and supervisors is provided below.

If you have questions or concerns about your rights as a participant in this research, about the conduct of the research, or the handling of the information you provide, you may contact Prof. Dr. Saskia Damen at: [s.damen@rug.nl](mailto:s.damen@rug.nl)

**Contact information**

Primary contact person, Master researcher:

Kayleigh Janinke Pater, BSc

E-mail address: [k.j.pater@student.rug.nl](mailto:k.j.pater@student.rug.nl)

Phone number: +31 6 43790673

Secondary contact person, First supervisor:

Prof. Dr. Saskia Damen

E-mail address: [s.damen@rug.nl](mailto:s.damen@rug.nl)

Third contact person, Content supervisor:

Dr. Joseph William Gibson

E-mail address: [joseph.william.gibson@statped.no](mailto:joseph.william.gibson@statped.no)

**Appendix B. Informed Consent Form Questionnaire**

**Informed Consent Form  
Questionnaire**

**Outdoor activities at schools for children with congenital deafblindness**

- I agree to participate in the research carried out by Kayleigh Janinke Pater, under the supervision of Prof. Dr. Saskia Damen and Dr. Joseph William Gibson.
- I have read the information provided in the Informed Consent Letter and I have had enough opportunity to ask questions.
- I understand the content of the research, what is asked from me in this research, the consequences my participation can have, how provided information will be processed, and what my rights as participant are.
- I understand that participation in the research is voluntary. I choose to participate myself. I can withdraw from the research until the end of data collection, October 2023. If I withdraw, I do not need to give reasons and there are no negative consequences.
- Below is indicated what I consent to.

Consent to participate in the questionnaire:

Yes, I consent to participate in the questionnaire.

No, I do not consent to participate in the questionnaire.

Consent to the processing of provided information:

Yes, I consent to the processing of information I provide as mentioned in the Informed Consent Letter.

No, I do not consent to the processing of information I provide.

Full name:

.....

Date: .....

Signature: .....

## Appendix C. Informed Consent Form Focus Group

### Informed Consent Form Focus Group

#### Outdoor activities at schools for children with congenital deafblindness

- I agree to participate in the research carried out by Kayleigh Janinke Pater, under the supervision of Prof. Dr. Saskia Damen and Dr. Joseph William Gibson.
- I have read the information provided in the Informed Consent Letter and I have had enough opportunity to ask questions.
- I understand the content of the research, what is asked from me in this research, the consequences my participation can have, how provided information will be processed, and what my rights as participant are.
- I understand that participation in the research is voluntary. I choose to participate myself. I can withdraw from the research until the end of data collection, October 2023. If I withdraw, I do not need to give reasons and there are no negative consequences.
- Below is indicated what I consent to.

#### Consent to participate in focus group:

- Yes, I consent to participate in the focus group.  
 No, I do not consent to participate in the focus group.

#### Consent to make audio / video recordings during the focus group:

- Yes, I consent to make audio / video recordings of me as participant in this research.  
 No, I do not consent to make audio / video recordings of me.

#### Consent to the processing of provided information:

- Yes, I consent to the processing of information I provide as mentioned in the Informed Consent Letter.  
 No, I do not consent to the processing of information I provide.

Full name:

.....

Date: .....

Signature: .....

## Appendix D. Recruitment Poster

### Research Participants Needed!



Who can join?  
Educational professionals working with children with congenital deafblindness at school  
Due to time limitations, at this stage of the research, only schools in geographically European countries are of interest

What for?  
A Thesis for the Deafblindness programme at the Department of Pedagogical Sciences at the University of Groningen

What is it about?  
An exploratory study regarding outdoor activities

What is expected of participants?

- Filling out a questionnaire (in English)
- Joining a focus group discussion (optionally)

Interested or questions?  
Contact the researcher at:  
[k.j.pater@student.rug.nl](mailto:k.j.pater@student.rug.nl)

Master Thesis by  
Kayleigh Janinke Pater, BSc

Supervised by  
Prof. Dr. Saskia Damen  
Dr. Joseph William Gibson



**university of  
 groningen**

## Appendix E. Overview of Online Questionnaire

**Table E**

*Overview of Online Questionnaire*

Questionnaire section	Content
Introduction	Summary about the aim of the research Request for participation in focus group discussion Guidelines for filling in questionnaire
Demographics participant	Nationality Age Gender Highest level of education Years of experience in the relevant field
Details school/profession	Country Participant's job position Number of students with CDB Age-range students Cognitive delay students Number of students with cognitive delay Motor delay students Number of students with motor delay
Outdoor activities	Explanation of what is meant with outdoor activities Do you do any outdoor activities with your students with congenital deafblindness? <sup>1</sup> What outdoor activities do you do with your students with congenital deafblindness? <sup>2</sup> Further details per outdoor activity: How often do you do this outdoor activity?, When do you do this outdoor activity?, With how many students do you do this outdoor activity? Does the school you teach at provide materials to use during outdoor activities? What materials, to use during outdoor activities, does the school you teach at provide? What outdoor areas do you use during the outdoor activities? Do you feel like the space you have for the outdoor activities is enough?

Questionnaire section	Content
Semantic development	<p>Are there certain goals or aims for your students with congenital deafblindness to achieve through the use of outdoor activities?</p> <p>What goals or aims are there for your students with congenital deafblindness to achieve through the use of outdoor activities?</p> <p>Explanation of semantic development</p> <p>Is there a focus on semantic development in students with congenital deafblindness during outdoor activities at your school?</p> <p>In what way is there a focus on semantic development during outdoor activities?</p> <p>In what ways do you communicate with your students with congenital deafblindness about outdoor activities?</p>
Experience-based learning	<p>Explanation of experience-based learning</p> <p>Is experience-based learning used during outdoor activities with students with congenital deafblindness at your school?</p> <p>Can you describe how experience-based learning is used during outdoor activities at your school?</p> <p>With regards to the outdoor activities with your students with congenital deafblindness, how much do you agree with the following statements?<sup>3</sup></p>
End of questionnaire	<p>Receiving participant number</p> <p>Thank you message</p>

<sup>1</sup> If no was answered, the participant would skip to a different (multiple choice) follow-up question. "For what reason do you not do outdoor activities with your students with congenital deafblindness?"

<sup>2</sup> This question allowed for 5 answers, but was followed up with a question to ask if participants had more outdoor activities to address. This repeated 3 times, allowing for 20 outdoor activities to be addressed in total.

<sup>3</sup> The 20 statements were based on the principles and conditions of experience-based learning, as described in the introduction.



## **Appendix F. Focus Group Information Sheet**

### **Research Outdoor Activities – Focus Group Information Sheet**

Below you will find some useful information regarding the topics we will be discussing during the focus group. You can read through this beforehand, but it is not necessary. During the focus group I will also take the time to explain the topics.

#### **Outdoor activities**

Within this research, outdoor activities can be defined as activities that you do outside. This means that the activities take place outside of the confines of a building. These activities can widely vary, but the most important aspect is the outdoors. You can think of sports, leisure, exploring, education, trips, as long as they take place outside.

#### **Semantic development**

For this research I have looked at language development, and literature states that a prerequisite for further language development is semantic development. Semantic development can be described as the development of the ability to connect meanings to certain concepts. This happens when a sign/gesture/word is connected to an object/activity/feeling. This way a relevant meaning can be assigned to the sign/gesture/word.

#### **Experience-based learning**

Experience-based learning cannot (yet) be reduced to a set of strategies, but there are certain principles that are important to experience-based learning and distinguish it from other approaches. For this research I found a set of principles and divided them into two categories. The first category contains a set of core-principles relating to the actual practice of experience-based learning. The second category contains certain conditions for experience-based learning. These principles are stated below:

#### ***Core-principles***

- Students are personally engaged in activities;
- Activities are in a concrete real-life and local context;
- There is an involvement of all the senses, such as residual hearing and sight, smell, taste, and tactile sense;
- The activity is reflected upon afterwards;
- Relevant life- and learning experiences are recognised and used during activities;

- The activities are structured and deliberately designed;
- The activities are a shared experience;
- The direct experiences of the students are articulated, communicated and reflected upon during the activities;
- The self-directive potential of students is valued and pursued;
- Learning outcomes of the activities are assessed.

### ***Conditions***

- Students' feelings are taken into account;
- Students' intellect is taken into account;
- Students' values are taken into account;
- There is a focus on the control and autonomy of the students;
- There is an equal relationship between student and educational professional;
- There is room for negotiation between student and educational professional;
- Educational professionals respect the students;
- Educational professionals validate the students;
- Educational professionals trust the students;
- There is a concern for student well-being.

## **Appendix G. Lists of Activities**

### ***List G1. Activities Responded in Questionnaire***

Archery, Art projects, Barefoot sensory walk, Basketball, Bowling, Build huts, Camping, Canoeing, Climbing, Collect outdoor objects, Community activities (visit other schools, make art, inclusivity workshops), Contact with/riding horses, Curling, Cycling, Dancing, Eating outdoors, Environmental education, Excursion to nature (forest, beach), Football, Gardening, Go to an amusement park, Go to a botanical garden, Go to a café, Go to church, Go to a restaurant, Go to the supermarket, Go to the market, Go to a museum, Go to the park, Go to the playground, Go to a theatre, Go to the zoo, Hammering (wood), Hoist up objects or students with rope, Lying in hammock, Make a fire, Make music, Messy play, Organised outdoor events (European Mobility Week, Yarn Bombing Week, “Olympics”), Orientation and Mobility training, Outdoor exploring, Play with ball, Polo, Prepare food, Pump water, Recycling (taking paper/glass to recycling bins), Relaxing, Running, Sailing, Sensorily experiencing the outdoor, Sensory experience walk, Set up hammocks, Sitting in hanging chair, Skiing, Sledding, Sport activities (generally mentioned), Swimming, Trampoline, Wading, Walking, Waterplay, Wood chopping, and Wood sawing.

### ***List G2. Activities Mentioned During the Focus Groups***

Barbecuing, Bicycling (tandem or wheelchair bike), Bowling, Brushing and/or riding horse, Climbing, Collect outdoor objects, Community activities, Community art project, Dancing, Do theatre, Eating outdoor (picnic), Environmental education, Excursion to nature, Experience natural objects in indoor ball pit, Gardening (connect smelling and planting herbs to certain weekdays), Go on a boat, Go on holiday (with more outdoor space), Go on natural ice (lake), Go to an amusement park, Go to the bakery, Go to a book fair, Go to a café, Go to the park, Go to the hairdresser, Go to the library, Go to the market, Go to a multi-sensory park, Go to a museum, Go to the playground, Go to the supermarket, Go to the theatre, Go to a therapeutic garden, Go to the zoo, Hammering, Hoist objects/persons up with ropes, Jump on trampoline, Lying in a cocoon chair, Lying in a hammock, Make a fire, Make music, Organised outdoor event (Mobility day), Orientation and Mobility training, Party, Pick fruit from tree, Play with animals, Play on school playground, Prepare food, Pump water, Relax on trampoline, Sensorily experiencing the outdoor, Shopping, Skiing, Slack line, Sledding, Sport activity (generally mentioned), Swimming, Tree chopping, Visit the police academy, Visit pedagogical university, Wading, Walking, Waterplay, Wood chopping, Wood sawing.

***List G3. All Mentioned Activities***

Archery, Art projects, Barbecuing, Barefoot sensory walk, Basketball, Bicycling (tandem or wheelchair bike), Bowling, Build huts, Camping, Canoeing, Climbing, Collect outdoor objects, Community activities (visit other schools, make art, inclusivity workshops), Contact with/brushing/riding horses, Curling, Dancing, Do theatre, Eating outdoor (picnic), Environmental education, Excursion to nature (forest, beach), Experience natural objects in indoor ball pit, Football, Gardening (connect smelling and planting herbs to certain weekdays), Go on a boat, Go on holiday (with more outdoor space), Go to an amusement park, Go to a book fair, Go to a botanical garden, Go to a café, Go to church, Go to a restaurant, Go to the bakery, Go to the hairdresser, Go to the library, Go to the supermarket, Go to the market, Go to a multi-sensory park, Go to a museum, Go to the park, Go to the playground, Go to the theatre, Go to a therapeutic garden, Go to the zoo, Hammering (wood), Hoist up objects or persons with rope, Jump on trampoline, Lying in a cocoon chair, Lying in a hammock, Make a fire, Make music, Messy play, Organised outdoor events (European Mobility Week, Yarn Bombing Week, “Olympics”), Orientation and Mobility training, Outdoor exploring, Party, Pick fruit from tree, Play with animals, Play with ball, Play on school playground, Polo, Prepare food, Pump water, Relax on trampoline, Recycling (taking paper/glass to recycling bins), Relaxing, Running, Sailing, Sensorily experiencing the outdoor, Sensory experience walk, Set up hammocks, Shopping, Sitting in hanging chair, Skiing, Slack line, Sledding, Sport activities (generally mentioned), Swimming, Tree chopping, Visit the police academy, Visit pedagogical university, Wading, Walking, Waterplay, Wood chopping, and Wood sawing

## Appendix H. Results Statements Experience-Based Learning

**Table H**

*Mean scores of responses per statement regarding experience-based learning*

Statement	Mean <sup>1</sup>	Std. Deviation
There is an aim to involve all the senses, such as residual hearing and sight, smell, taste, and tactile sense	5.00	.000
There is an aim to take the students' feelings into account	5.00	.000
There is an aim to recognise and use students' relevant life- and learning experiences	4.95	.229
There is an aim to engage students personally in activities	4.89	.315
There is an aim to take the students' values into account	4.89	.315
There is an aim to make the outdoor activities a shared experience	4.89	.315
There is an aim for educational professionals to respect the students	4.89	.459
There is a concern for well-being of the students	4.84	.375
There is an aim to value and pursue the self-directive potential of the students	4.84	.501
There is an aim to focus on the control and autonomy of the student	4.79	.419
There is an aim for outdoor activities to be in a concrete real-life and local context	4.79	.535
There is an aim to take the students' intellect into account	4.79	.535
There is an aim to articulate, communicate and reflect the direct experiences of the students	4.79	.535
There is an aim for educational professionals to validate the students	4.74	.562
There is an aim to reflect on the outdoor activities afterwards	4.74	.562
There is an aim for educational professionals to trust the students	4.63	.684

There is an aim for the outdoor activities to be structured and deliberately designed	4.53	.772
There is an aim to have an equal relationship between student and educational professional	4.53	.905
There is an aim to have room for negotiation between student and educational professional	4.53	.905
There is an aim to assess the students' learning outcomes from the outdoor activities	4.42	1.071

*Note.* This table shows the mean scores, and standard deviation of Likert-scale responses by educational professionals on statements regarding the use of principles and conditions of experience-based learning during outdoor activities with students with CDB.

<sup>1</sup> The Likert-scale responses 'Strongly disagree', 'Somewhat disagree', 'Neither agree nor disagree', 'Somewhat agree', and 'Strongly agree' were respectively given the values 1-5.

## Appendix I. Identified Strategies to Stimulate Semantic Development

**Table I**

*Identified Strategies to Stimulate Semantic Development of Students with CDB During Outdoor Activities*

Strategy	Implementation
Prepare students for an activity	<p>Talk about the coming activity through signs, gestures, objects of reference/tangible symbols, pictograms, or words, depending on the student.</p> <p>Use an activity calendar to refer to planned activities.</p> <p>Use ‘language experience stories’ which are tactile stories that have a similar narrative structure as the activity.</p> <p>Use ‘memory books’ which are tactile books with collected items from the experience</p>
Repetition	<p>Repeat activities consistently.</p> <p>Visit the same outdoor location.</p> <p>Connect repetition of activities to certain seasons or weekdays.</p>
Offer real and full experiences	<p>Offer activities in an authentic setting, the “real world”.</p> <p>Include all steps of an activity, from beginning to the end.</p> <p>Undertake multiple activities regarding one theme.</p>
Opportunities for sensory exploration	<p>Motivate students to sensorily explore with all senses during the activity.</p>
Name concepts	<p>Acknowledge and name concepts, such as objects, actions, or feelings, through signs, gestures, objects of reference, pictograms, or words, depending on the student.</p> <p>Also do this in the moment that the student is experiencing certain concepts.</p>

Strategy	Implementation
Make connections across situations	Connect outdoor experiences with indoor experiences.
Pay attention to the student's reaction of understanding	Look for the student's reaction of understanding the name given to a concept, for example through their body language.
Reflect on- and/or relive the experience after the activity	<p>Recognise what aspect of the activity was meaningful for the student and reflect on this after the activity.</p> <p>Use 'language experience stories', which are tactile stories that have a similar narrative structure as the activity.</p> <p>Use a 'memory book', which are tactile books with collected items from the experience.</p> <p>Use a conversation box, with collected items from the outdoor activity.</p> <p>Use an activity calendar to refer to the finished activity.</p> <p>Use big gestures to emphasise the experiences.</p> <p>Imitate the experiences.</p>
Gross motor activities	Undertake activities with gross motor movements, for easier reflection on the activity.
Offer activities in a narrative structure	Offer activities in a narrative structure for easier reflection on the activity.
Make activities a shared experience	<p>Engage in activities together.</p> <p>Have a shared focus.</p> <p>Sense together with the student and let the student feel that you are doing so.</p>
Consistently use experience relevant signs, gestures, or objects of reference	Use signs/gestures/objects of reference which are relevant to the experience, such as used objects or movements made by the student during the activity (natural signs).



Strategy	Implementation
	Coordinate the used signs/gestures/objects of reference with colleagues, to consistently use it the same way.
Offer choices	Offer choices between and within activities.
Use motivating/emotionally loaded vocabulary	Use vocabulary that excites the student.
Adapt activities to students' needs	Adapt activities to the physical and intellectual needs of the student.

*Note.* These strategies and the implementation are based on the experiences of educational professionals during outdoor activities with students with CDB. These strategies have not been tested and cannot be correlated to the actual stimulation of semantic development of students with CDB.

## Appendix J. Identified Principles and Conditions of Experience-Based Learning

**Table J**

*Identified Principles and Conditions of Experience-Based Learning Used During Outdoor Activities*

Principles and Conditions	Implementation
Students personally engage in activities <sup>a</sup>	Encourage students to participate by letting them feel how to do something.
Activities take place in a concrete, real-life, and local context <sup>a</sup>	Find learning opportunities within real life situations. Use logical activities according to the current situation.
There is an involvement of all senses during activities, such as residual hearing and sight, smell, taste, and tactile sense <sup>a</sup>	The outdoor environment itself gives sensory stimulation through natural elements. Reassure that there is as much sensory information intake as possible during an activity.
Relevant life- and learning experiences are recognised and used during activities <sup>a</sup>	Ask parents/caregivers about earlier experiences of the student. Plan an activity based on known previous experiences of the student.
The activities are structured and deliberately designed <sup>a</sup>	Activities have a goal. Create situations in which a goal can be worked on. Let student experience different aspects of one concept in different situations. Use role play to simulate a coming activity, to prepare the student.
The activities are a shared experience <sup>a</sup>	Explore by sensing together, and let student feel that you are doing so. Be in a state of co-presence/joint attention.
The direct experiences of the students are articulated, communicated, and reflected upon during activities <sup>a</sup>	Connect the experience with the meaning, in the situation. Articulate changes that occur during an activity.

Principles and Conditions	Implementation
Students' self-directive potential is valued and pursued during activities <sup>a</sup>	Name what the students feels, sensorily.
	Name the student's feelings, emotionally.
	Name actions (verbs).
	Use signs, gestures, objects of reference, or pictograms.
The activities are reflected upon afterwards <sup>a</sup>	Use short haptics in situations where elaborate communication is not possible.
	Encourage decision making.
	Allowing the decisions a student makes and facilitating this.
	Take physical distance to stimulate a student's own initiatives.
	Recognise what aspect of the activity was meaningful for the student and reflect on this after the activity.
	Use tactile book with miniatures of relevant objects, which is in the narrative structure similar to the activity.
	Use 'language experience stories', which are tactile stories that have a similar narrative structure as the activity.
Students' feelings are considered <sup>b</sup>	Use a 'memory book', which are tactile books with collected items from the experience.
	Use a conversation box, with collected items from the outdoor activity.
	Use an activity calendar to refer to the finished activity.
	Use big gestures to emphasise the experiences. Imitate the experiences.
Make the experience as positive as possible for the student.	

Principles and Conditions	Implementation
Students' intellect is considered <sup>b</sup>	Activities depend on the abilities and level of knowledge of the student.
Students' values are considered <sup>b</sup>	Take personality into account, including likes and dislikes.
Control and autonomy of the students is considered <sup>b</sup>	Encourage independence. Work towards independent participation within an activity.
There is room for negotiation between student and educational professional <sup>b</sup>	Negotiate participation: Respect student's (initial) refusal to participate and let them only feel first.
Educational professionals trust the students <sup>b</sup>	Establish mutual trust.
There is a concern for student well-being <sup>b</sup>	Offer a safe environment. Be cautious of possible dangers.

*Note.* The implementation of these principles and conditions is based on the experiences of educational professionals during outdoor activities with students with CDB. The implementation of these principles and conditions, in the described ways, have not been tested to be beneficial during outdoor activities with students with CDB.

<sup>a</sup> Principle of experience-based learning.

<sup>b</sup> Condition of experience-based learning.