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Assessment of the Functional Hearing of Children with Deafblindness and Additional Complex Disabilities

Ines Weber

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Content



1. Triangulation in Research Methods
2. Literature Review and Expert Hearing
3. Introduction Master Thesis
4. Aim of the Study
5. Research Question
6. Method
7. Results
8. Limitations
9. References

Triangulation in Research Methods



- **Triangulation** refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of a phenomena (Patton, 1999)
 - to increase the level of knowledge about a topic from different perspectives
 - to strengthen the researcher's standpoint from various aspects
 - to test validity through the convergence of information from different sources (Patton, 1999)

Triangulation in Research Methods



Different types of Triangulation (Denzin in Flick, 2014)

→ *data triangulation*

→ the use of different data sources (to study a phenomena at different dates, places and from different persons)

→ *investigator triangulation*

→ different observers or interviewers are employed (to detect or minimize bias resulting from the researcher)

→ *theory triangulation*

→ to include different perspectives, hypotheses, various theoretical points of view

→ *methodological triangulation*

→ *within-method-triangulation* (e.g., different subscales for measuring an item in a questionnaire)

→ *between-method-triangulation* (to combine different methods)

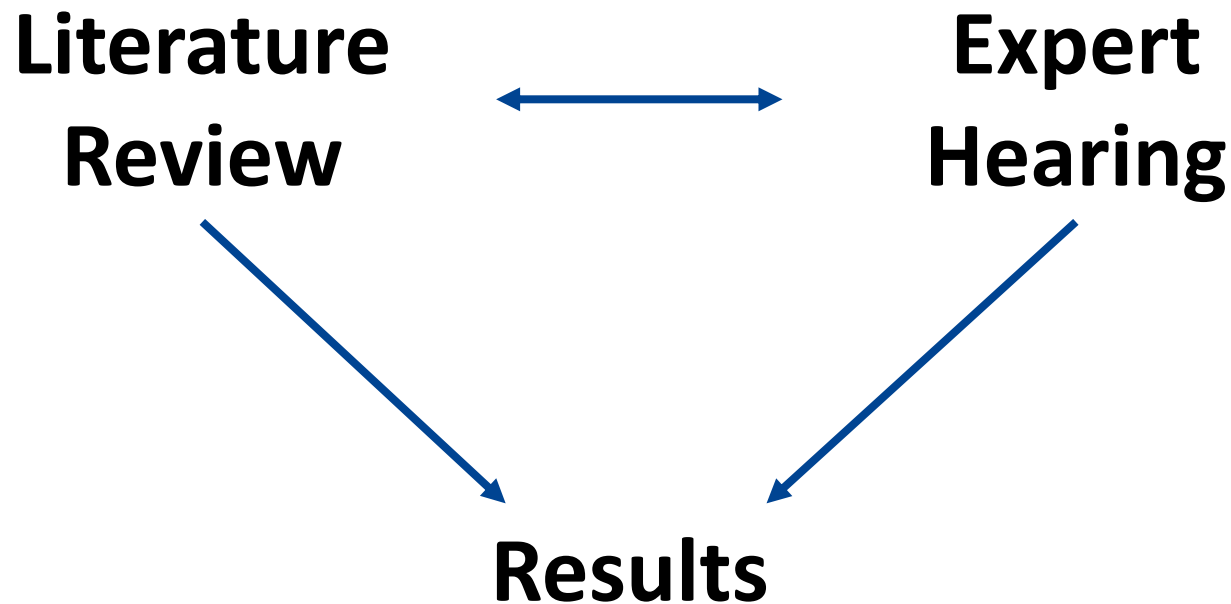
Triangulation in Research Methods



“Triangulation means that researchers take **different perspectives on an issue** [...] in answering research questions. [...] Triangulation should **produce knowledge on different levels** [...] that go beyond the knowledge made possible by one approach [...]” (Flick, 2014, p. 184)

Triangulation in Research Methods

Master Thesis: Methodological Triangulation



Introduction



“Deafblindness is a combined vision and hearing impairment of such severity that it is hard for the impaired senses to compensate for each other.

Thus, deafblindness is a distinct disability.”

(Nordic Definition in Deafblind International, 2018, p. 2)

→ the systematic identification of congenital deafblindness is mostly intractable and difficult

“1) inconsistent definitions of deafblindness,

2) a huge heterogeneity within the group of individuals with congenital deafblindness, and

3) difficulties in assessing sensory functioning in persons with severe cognitive and behavioural deficits, since testing requires cooperation of the person in question.” (Dammeyer, 2012, p. 101)

Introduction



- the study of Lang, Keesen, and Sarimski (2015) aimed to determine
- (1) the prevalence of children with deafblindness,
 - (2) the frequency of the occurrence of additional disabilities, and
 - (3) their distribution among different special needs institutions in Germany.

Results of the Study

- (1) prevalence of **0.01%** with about **1.300** children and adolescents with (functional) deafblindness
- (2) **95%** of the target group has **multiple impairments** (intellectual and physical disability)
- (3) **62%** of these children or adolescents are educated in **non-specific special needs institutions** (Lang, Keesen, Sarimski, 2015)

Introduction



Consequences

- there may be a significant number of **unidentified individuals** with deafblindness and further severe disabilities
- these individuals may receive **inappropriate schooling** and **lack deafblind-specific educational support**
- there is a risk that basic needs such as **security** and **control, social participation** and **communication** will not be met

(Lang, Keesen, Sarimski, 2015)

Aim of the Study



- **to get insight** in how functional hearing of children with deafblindness and additional complex needs can be **assessed** and **evaluated**, in order
- **to adapt** the physical and social environment,
- **to additionally supply deafblind-specific** support in order **to improve** the quality of life, and
- **to fulfil** social-emotional, communicative, and basic needs of security.

Research Question



How can professionals evaluate and assess
the functional hearing of
children with deafblindness
and additional complex disabilities?

Research Question



- (1) What is already known about the assessment of children with deafblindness, and additional complex needs in the literature?
- (2) What is already known about the assessment of functional hearing of children with deafblindness and additional complex needs in the literature?
- (3) What is already known about the assessment of functional hearing by means of smartphone-based applications in the literature?
- (4) What do experts consider to be important when assessing children with deafblindness?
- (5) What do experts consider to be important when evaluating the functional hearing of children with deafblindness?
- (6) What are the experts' opinions on the use of smartphone-based application for the measurement of the functional hearing?

Method



(1) Literature Review

- analysis of the **central themes** within the research through comparisons of different sources (Hart, 2018)
- there are **different types** of literature review (Snyder, 2019)
 - ***systematic review***
 - strict requirements for search strategy and selection of articles
 - synthesize and compare evidence (research articles)
 - ***semi-systematic review***
 - overview research area & track of development over time
 - e.g., state of knowledge, historical overview, theoretical model
 - ***integrative review***
 - Critique and synthesize
 - usually not systematic (research articles, books, other published texts)

Method



(1) Literature Review

- **semi-systematic literature review**
- **illustration and synthesis** of a cross-section of various topics
 - assessment of individuals with deafblindness
 - assessment of functional hearing of individuals with deafblindness
 - hearing evaluation through smartphone- and tablet-based applications
- **various search engines** (Science Direct, SAGE journals, ERIC, EBSCOhost, PsychINFO, SmartCat) for handbooks, journals, online publications of academic research articles, handbooks
- **inclusion criteria**
 - 1) the publications were academic papers or academic texts,
 - 2) the papers/texts were published in scientific journals or book chapters,
 - 3) the papers/texts were published after the year 2000, and
 - 4) the papers/texts were published in the English or German language

Method

(1) Literature Review

→ classification matrix (Hart, 2018)

Author Year Article	Purpose, Theoretical or Conceptual Framework	Method	Major Findings (Analysis & Results)	Core Citations
<p>Andersen & Rødbroe (2006c) Identification of congenital deafblindness.</p>	<p>Suggestions for relevant medical examination and procedures for functional assessment of the use of the senses.</p>	<p>Review of literature and practices of assessment of hearing.</p>	<p>Medical examinations: → anamnesis → clinical examination of auditory functioning (tympanometry, stapedius' reflex measurement, audiometry,... </p>	<p>“Teachers of hearing impaired, audiological assistants in cooperation should carry out the functional assessment of hearing with experts on congenital deafblindness. [...] The assessment of hearing should be made under the best possible physical and social conditions” (p. 8) ...</p>

(2) Expert Hearing/ Focus Group

- a specific method of a **semi-structured interview** to **gain in-depth insight into a professional's expertise** in the respective field (Flick, 2014)
- the definition of an expert hearing was extended to include the defintory contents of a **discussion with a focus group**:
“a small number of individuals, brought together as a discussion or resource group” (Blumer 1969 in Flick, 2014, p.244)
- **selection criteria** to chose **participants (N=8)**:
 - a) a professional that has been working in the field of deafblindness for more than four years,
 - b) a professional that has been working in the field of assessment of children with deafblindness and/or children with complex needs, and
 - c) a professional that has been working in the field of audiology of children with deafblindness and/or children with complex needs.

Method



(2) Expert Hearing/ Focus Group (N=8)

- to gather **specific knowledge** on the **assessment** of individuals with deafblindness, and the **assessment of functional hearing** of individuals with deafblindness
- to discuss **digital-based procedures** to evaluate functional hearing

Method



(2) Expert Hearing/ Focus Group (N=8)

- **data analysis** was conducted in accordance with **qualitative content analysis** (Kukartz, 2018; Mayring, 2016)
- **structured content analysis** facilitated as a gradual analysis of the transcribed data
- the **category system** resulting from the analysis was theoretically guided by the material
- combination of **deductive** and **inductive** approach

Method

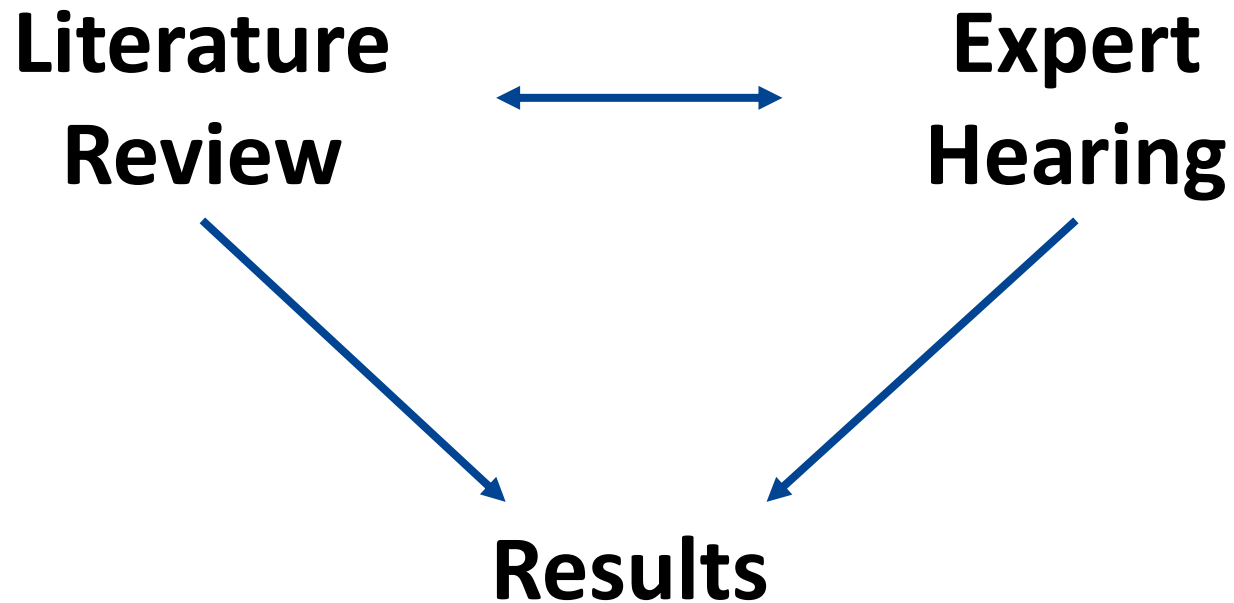
Table 1

Analysis of expert hearing summarised in the category system.

	Category	Category Label
Section 1	1. M-C	Diagnosing Deafblindness: Process And Procedures
	1.1. S-C	Clinical assessment
	1.2. S-C	Difficulties regarding diagnosis
	1.3. S-C	Interrelation between clinical and functional assessment
	1.4. S-C	Method of assessment
Section 2	2. M-C	Identification
	2.1. S-C	Functional assessment
	2.2. S-C	Attitude towards assessment tools
	2.3. S-C	Interpretation
Section 3	3. M-C	Factors Influencing Functional Assessment
	3.1. S-C	Relationship
	3.2. S-C	Communication systems
	3.3. S-C	Perception
	3.4. S-C	Quality
	3.5. S-C	Socioeconomic conditions
Section 4	4. M-C	Digital-based Assessment
	4.1. S-C	Meaningful content
	4.2. S-C	Difficulties regarding digital-based assessment
	4.3. S-C	Attitude towards digital-based assessment
	4.4. S-C	Additional technical features

Results

Results of the Study



Results



Results of the Study

- (1) Lack of Standardised Assessment Instruments and Procedures
- (2) Assessment of Functional Hearing as a Flexible and Holistic Process
- (3) Innovative Assessment Tools to Evaluate Functional Hearing

Results of the Study



(1) Lack of Standardised Assessment Instruments and Procedures

- Lack of standardised assessment instruments for a normative group of individuals with deafblindness
- Individuals with deafblindness comprise an extremely heterogeneous group
 - No generalized statements about these people are valid or appropriate
- Lack of a concrete diagnostic pathway, possible misdiagnosis (over- and under-diagnosis), and the lack of a uniform clinical definition of deafblindness

Results of the Study



(2) Assessment of Functional Hearing as a Flexible and Holistic Process

→ Overarching objective of assessment:

- the planning of interventions
- the adaptation of the physical and social environment

→ Definition of the aim of the assessment of functional hearing

- to detect whether and to what extent the specific physiological functions are operating within the hearing process
- to determine a precise evaluation of hearing threshold, or
- to identify an approximation of the spectrum of frequency and volume in which a child can perceive auditory stimuli.

Results of the Study



(2) Assessment of Functional Hearing as a Flexible and Holistic Process

→ Objective measurements

- Evaluation of otoacoustic emissions
- Auditory brainstem response
- Cochleographics
- Examination of physiological functions

→ Subjective measurements

- Pure-tone audiometry
- Visual reinforcement audiometry
- Play audiometry
- Sound-field audiometry

Results of the Study



(2) Assessment of Functional Hearing as a Flexible and Holistic Process

- Video recordings support the (informal) assessment procedures
- Assessment conducted in a familiar environment with minimal ambient noise and no visual distractions
- Optimal positioning, especially for individuals with physical and motor disabilities
- The volume, as well as the distance between the sound source and the child must be considered
- The sounds must be meaningful to the child (e.g. favourite songs, voices, sound producing toys)

Results of the Study



(2) Assessment of Functional Hearing as a Flexible and Holistic Process

- Establishment of a relationship and basis of trust between the assessor and the child
- Participation of a person of reference, e.g., educators, parents
 - Familiar environment
 - Support of evaluation and interpretation of the results
- Inclusion of competent colleagues during the evaluation and interpretation of the results through video recordings

Results of the Study



(3) Innovative Assessment Tools to Evaluate Functional Hearing

- Major technological developments in the field of hearing screening
- Development of smartphone- or tablet-based **screening-tools** as an alternative and innovative approach to evaluate functional hearing
- Gold standard and conventional method remains the use of a calibrated and standardised audiometer
 - Time and resource consuming, access to testing facilities may be limited

Limitations



- **limited literature** on the subject of assessment of functional hearing in children with deafblindness (revision of inclusion criteria)
- the semi-systematic review should have been conducted as a **scoping review** (e.g., PRISMA-ScR) (Arksey & O'Malley, 2005; Munn et al., 2018; Shamseer et al., 2015)
 - specific reporting items and flow diagrams should have been used to classify and sort literature
- **lack of time** considering the expert hearing (scheduled 90 minutes, real time 120 minutes)

Thank you!

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