

# Digital Participation in TBI: A Scoping Review Protocol about Assessment Tools for CMC

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This protocol is accessible to the public:

[https://www.germanistik.uni-muenchen.de/forschung/proj\\_gl/neuropragmatik/index.html](https://www.germanistik.uni-muenchen.de/forschung/proj_gl/neuropragmatik/index.html)

**Aim:** In this scoping review, following the PRISMA criteria, we aim to provide an overview of currently available instruments that help assess CMC use as a measure of digital participation in the TBI population. In a multistage selection process following the PRISMA criteria, these instruments are to be examined in terms of items that assess digital participation. The outcome of the review should provide an overview of the status quo of potentially available instruments that capture aspects of CMC.

**Methods and analysis:** We will follow the Joanna Briggs Institute guidance for scoping reviews (Elm et al. 2019; Tricco et al. 2018). Literature searches of electronic databases (e.g., EBSCO, PsycINFO) will be conducted from inception onwards. The electronic search

won't be supplemented by searching for sources that index unpublished or difficult-to-locate studies.

**Synthesis of results:** Results will be summarized by quantitative (frequency of items, sample size) and descriptive aspects objectives/ study designs / context) in order to identify the suitability of tools for capturing aspects of CMC in TBI. It is anticipated that the review should provide an overview of the potential and the limitations of the methods used in the studies.

## 1. Introduction:

Individuals with chronic traumatic brain injury (TBI) are often affected by communication disorders which might have an impact on their social participation. Due to possible cognitive and communicative disabilities, as well as impairments of social cognitive skills, individuals with TBI (lwTBI) have been observed to exhibit difficulties in maintaining and establishing social relationships, resulting in a greater risk of social isolation. This applies to both in-person as well as computer-mediated communication (CMC), which is considered an integral part of everyday life. Research on digital participation in the TBI population has focused on the possible challenges and barriers, but also on the benefits of CMC for social interactions. Guidelines from professional societies recommend questionnaires and checklists for assessing restrictions of communicative participation (e.g., ASHA, INCOG). However, there is no overview of whether the available instruments can capture digital aspects of participation or social media use in TBI.

The limitations of a TBI affect not only in-person communicative situations, but also digital forms of communication and information processing. Therefore, lwTBI belong to the population groups that are vulnerable to the “digital divide” (Duplaga, 2017). The term “digital divide” describes the differences in access to and use of information and communication technologies, especially the Internet, between different population groups that result from technical, socioeconomic and individual factors (Rogers, 2001). The digital divide has been described on different levels: general access to the necessary technologies (first level), inequalities in actual use (e.g., scope, variety, and type of use) (second level), and

inequalities in the utility gained (third level), i.e., how individuals benefit from participating in the digital world (Chuah et al., 2022).

Given the ongoing trend of increased digitalization in society, it may be expected that challenges in the context of digital participation in TBI will increase in relevance. Therefore, the need for information regarding methods to measure digital participation will become even more important for speech and language therapy and for neurorehabilitation in general. In this context, it is important to consider that methods for surveying digital participation should also take into account different levels of the digital divide and also take into account the levels of participation as well as the level of activities within the framework of the International Classification of Functioning, Disability and Health (ICF) (WHO, 2021).

## **2. Definitions:**

In this Scoping Review (SR) the focus is on **Computer-Mediated Communication**.

**Computer-Mediated Communication (CMC):** This term refers to all types of communicative interactions conveyed by electronic devices such as smartphones, laptops or tablets (Flynn et al., 2019). The mediated information can be based on texts, audios or videos, which are often used in order to establish or maintain social relationships or exchange information in personal or professional contexts (Flynn et al., 2019; Morrow et al., 2021b). One of the most predominant forms of CMC is social media, especially social networking sites (e.g., Facebook, Twitter), blogs (e.g., Tumblr) or online content communities (e.g., Youtube) (Baker-Sparr et al., 2018). Social media are characterized by user-generated content, that is to say, content is created by an interactive exchange of users for the purpose of sharing personal or non-personal information and providing feedback on other users' content (Morrow et al., 2021b).

## **3. Overall review objective:**

The aim of this scoping review is to provide an overview of currently available instruments that help to assess CMC use as a measure of digital participation in adults with TBI of all degrees of severity. The instruments found in the review process will then be presented in terms of their construction and objectives. Finally, recommendations for the assessment of CMC will be given and research gaps in this field will be identified.

Our search questions are:

- Have measurement tools (surveys, questionnaires, ratings) for CMC been published?
- How many measurement tools can be found in the specified search period?
- Are these measurement tools available for use in practice?
- Do these measurement tools reveal the opportunities and barriers for people with TBI in relation to digital participation?

#### **4. Details of any preliminary searches undertaken:**

A previous review on communicative participation and quality of life (QoL) in people with TBI (Falkowska et al., 2021) showed that none of the procedures found directly involve digital aspects of communication. Therefore, the need to conduct a new search that directly addressed CMC was evident.

#### **5. Explanation of need for review:**

Social media and other forms of CMC have radically influenced the quality and nature of social relationships and communication (Baker-Sparr et al., 2018; Morrow et al., 2021b). As opposed to face-to-face communication, CMC connects communication partners independent of their geographical location, which is especially beneficial for individuals living in areas with low infrastructure or with restricted mobility (e.g., physical disabilities). The computer-mediated exchange can be partly asynchronous, which eliminates time constraints while planning and composing messages (e.g., e-mailing). CMC often provides fewer or no non- and paraverbal information (e.g., text messages), which leads to an emphasis of verbal content (Flynn et al., 2019). IwTBI may be affected by various persistent consequences (Stocchetti and Zanier, 2016). Among them are difficulties in managing various types of communicative acts (Lê et al., 2022) due to neuropsychological deficits such as limited sustained attention and increased reaction time (Salmond et al., 2005). According to Stocchetti and Zanier (2016), IwTBI may have diminished social participation and therefore increased social isolation compared to healthy peers.

The development and use of adaptive strategies in the context of social media use may nonetheless present a beneficial resource for improving social participation within the TBI population (Morrow et al., 2021b).

Therefore, it is very important to have an overview of tools that can capture CMC in participation in order to make possibilities but also barriers visible. Information about CMC is also crucial in order to shape interventions according to the digital needs of people with TBI.

## **6. Eligibility criteria (with contextualization and rationalization)**

Since the focus is on CMC, only procedures that thematically cover this area in their construction or contain at least one item on this topic are accepted.

In addition, only procedures that are suitable for the TBI population and have been tested on this population are to be included. This is necessary because other populations can also be the focus of research in relation to CMC. Research on CMC in general or concerning other groups (e.g., people with substance abuse problems) poses different questions and has different objectives than research concerning people with TBI and is therefore excluded. Similarly, research that only includes participants under the age of 18 is excluded, as pediatric TBIs have a different influence on individual development than those in adulthood. The author team agrees that the following tools or test procedures are examples of non-included procedures.

- Procedures that only measure QoL without digital aspects (e.g., Satisfaction with Life Scale [SLS]),
- Procedures that exclusively test linguistic functions outside of a communicative context (e.g., Hayling Sentence Completion Test [HSCT]),
- Procedures which test the prerequisites and basic functions of cognition without a communicative context (e.g., Facial Expression of Emotion-Stimuli and Tests [FEEST]),
- Procedures that measure the emotional state after TBI and are intended, for example, to detect depression (e.g., Hospital Anxiety and Depression Scale [HADS]),

- Procedures that assess cognitive behavioral aspects of problematic Internet use unrelated to TBI population (e.g., Generalized Problematic Internet Use Scale 2 [GPIUS2]).

The entire study selection process is to be shown graphically in a flow chart. In addition, tracking the decisions to include or exclude studies and plotting these decisions on a PRISMA flow diagram is now mandatory for all systematic reviews and is increasingly being done in other type of reviews (such as SR), as it is a generally accepted requirement for manuscript publication (Ouzzani et al., 2016).

## **7. Sample search strategy**

Prior to conducting the scoping review, a search of relevant databases is to be conducted to examine the availability of existing and comparable reviews on the topic. The following databases are to be searched for this purpose:

- Cochrane database
- ClinicalTrials.gov database
- Speech-Bite (if applicable)

The literature search is to be conducted in four different databases during the period of 2023-01-16 and 2023-02-03.

The following databases, which had already proved relevant in a previous review on TBI (Falkowska et al., 2021), are to be selected for inclusion. The composition of the group of authors is the same as in this review (Büttner-Kunert, Falkowska, Heider, Resch, Royko).

These databases are: Web of Science Core Collection, Ovid, PsycInfo and Psynindex.

The arrangement of the keywords is to be discussed by the authors.

Boolean operators are to be applied for the key words: “traumatic brain injury” OR “head injury” OR “brain injury” OR “tbi” AND “chat” OR “social media” OR “digital participation” OR “computer mediated communication” OR “computer-mediated communication” OR “internet use” OR “messenger” AND “assessment” OR “screening” OR “survey” OR “questionnaire”. The search strategy should be performed on the title. Depending on the database, the results should either be filtered by adulthood or filtered manually according

to the age group. The electronic search won't be supplemented by searching for sources that index unpublished/difficult-to-locate studies. The full text search also takes into account references to further hits (e.g., questionnaires for CMC, e.g. in the reference list).

The library services of the University Library of the LMU Munich are to be consulted for this purpose. Search results will be imported and stored in CITAVI software. All authors have access to the SR cloud project in CITAVI.

## **8. Study Selection**

The first study selection process will be conducted with the Rayyan program (Ouzzani et al., 2016). Rayyan (<http://rayyan.qcri.org>) is a web and mobile app that helps expedite the initial screening of abstracts and titles using a process of semi-automation while incorporating a high level of usability. After deleting the duplicates, the titles and abstracts of the articles found should then be reviewed independently by at least two authors. Each article should be independently screened for eligibility by at least two reviewers. Deviations are to be discussed in the author group.

## **9. Explanation of search approach**

The databases Web of Science Core Collection, Ovid, PsycInfo and Psynindex are to be screened for publications between the years 2013 and 2023 with relevant search terms referring to social participation, assessment tools, CMC and the target group, in order to find suitable tools to assess digital participation in IwTBI.

## **10. Study selection process, including resolving disagreements between reviewers**

The author team agrees that in case of discrepancies, all authors will read the full text of the respective article and then decide on the inclusion of the article under close scrutiny of the inclusion and exclusion criteria. It is anticipated that data will be extracted

- on characteristics (research questions, aims) of the studies in which the tools for CMC are applied,

- on the target group,
- on sample size,
- on the duration of implementation of the tool,
- and on availability.

Data abstraction will be conducted using a standardised Excel form. To conduct data abstraction, a training exercise will occur among the team using a random sample of 1-2 included studies. A tabular overview should be provided of the finally selected studies and their main applied measures. A draft charting table/form for data extraction and accompanying explanation will be provided in the SR.

Authors & Year	Main applied Measures	Target Group	Sample Size	Research Question(s)/ Aim(s) of the Study	Scope	Question Types	Duration of Implementation	Availability

## 11. How results and data will be presented

Synthesis of results: Results will be summarized by quantitative (frequency of items, sample size) and descriptive aspects (objectives/ study designs / context) in order to identify the suitability of tools for capturing aspects of CMC in TBI. It is anticipated that the review should provide an overview of the potential and the limitations of the methods used in the studies. If possible, we will stratify results by psychometrics of the tools included. A meta-analysis will not be performed. The data is to be presented in the form of draft charts and tables.

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