'Bridging' social contexts to learn from everyday life (mis)communication incidents: The design of a digital reflection tool for primary school children with language impairments

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Abstract. Children with specific language impairments often experience miscommunication in the various social environments they engage in (e.g. school, at home, at leisure). In this study, a digital reflection tool has been designed to support children with capturing (both positive and negative) (mis)communication incidents they experience during their everyday life with the help of an artefact they create. Subsequently, this artefact is used to support children to reflect on this critical incident, individually or together with their teacher, coach, parents or peers, across social contexts they engage in. The aim of this study was to design a usable and user-friendly digital reflection tool to enhance children's (self-insight in) their communication skills and improve their communicative behavior. The study is organized in two phases: in the first phase a theoretically informed digital reflection tool was designed and evaluated on its usability and user-friendliness through a design-based research approach with various stakeholders. In the second phase, the tool was evaluated on expected effects on communication insight, skills and behaviour of primary school children with specific language impairments in educational practice. This paper reports on theoretical concepts that guided the design-based research phase and informed the design of the digital reflection tool.

Keywords: Reflection, Mobile learning, Seamless learning, Ubiquitous Learning, Learning Design, Situated learning.

1 Introduction

A specific language impairment (SLI) is a neuropsychological disorder of genetic origin characterized by a retarded language development process of children, in comparison to their peer group. Children with SLI are behind with their speech and/or natural language development, without causes such as hearing problems, neurological disorders or a low non-verbal IQ [1, 2, 3, 4]. Due to their language impairment children

often experience miscommunication incidents, potentially leading to mutual misunderstandings, inability to express oneself, no turn taking in conversations, no or insufficient eye contact or no connection to the subject of the conversation. This is often a cause of frustration, both for the sender as the receiver in the communication process, and may even lead to impeded social contacts, social phobias and loneliness [5,6,7].

While (mis)communication incidents happen in various social contexts and its frequency is unpredictable, it is difficult to guide, support and supervise children when learning how to cope with and learn from their personally experienced (mis)communication incidents, both positive and negative. Incidents need to be recalled and described and contextual factors that may have partly caused an incident need to be identified and taken into account. This is particularly difficult for children with a language impairment, as they are experiencing problems with their auditory and visual cognitive working memory [8,9], making the reconstruction of a personally experienced (mis)communication incident and situation difficult. Currently, reflection at Royal Dutch Kentalis (https://www.kentalis.com/kentalis-netherlands) is therefore often organized on a classroom level, based on a teacher-selected (mis)communication incident of one of the children that entails both the incident as well as the contextual factors. Consequently, most children are not reflecting on their own communication experiences, but on experiences of another child. This while elaborating and building upon personal experiences is an important component of learning and reflection processes [10, 11].

In this study we aimed to support children with SLI to learn from their personal communication experiences in various social contexts (e.g. school, at home, at leisure) through reflection. To support their retrieval of (mis)communication incidents a digital reflection tool was designed, aiming to support them with 'capturing' a (mis)communication incident and its social context both in-and-outside school. This allows them to share the artefact that they created with the different types of stakeholders (across social contexts) that coach and interact with children with a language impairment, such as teacher/coaches, logopeadist, orthopedagogue, peers and parents. Sharing the artefact was meant to facilitate collaborative reflection and coaching of a child. This paper reports on the theoretical concepts that guided the design of this digital reflection tool, called 'Communication Mirror'.

2 Theoretical framing of the digital reflection tool 'Communication Mirror'

2.1 Mobile Seamless learning and hybrid learning environments

People learn individually and collaboratively across the many different social environments they are part of or move through, by being active in formal and informal settings (e.g. school, at home or at leisure), in physical and digital worlds, across time, locations and by making use of different instruments or devices [12]. However, currently chances to benefit from making connections between learning experiences across those environments are mostly left unexploited [13]. 'Seamless learning' is about connecting (learning) experiences and learning activities that learners experience in various environments and settings through technology-supported learning scenario's using mobile/wireless/handheld devices, thus supporting, improving and enhancing learning-and support-processes [12]. The main objective is that learners experience a *continuity of learning* across environments and settings (natural versus designed combinations of locations, technologies and social practices) at different times (adapted from [14], p.24; [15]). Key to the 'Seamless learning' paradigm are design decisions made on how to *facilitate continuous, non-disruptive contextualized learning* and support processes and how learning support is implemented with the help of wireless/handheld devices and technological tools [13]. The resulting designs can often be classified as hybrid learning environments or, alternatively defined by [16], configurations (p.16):"*A HLC is a carefully configured practice that includes ... actors (e.g. (i.e. students, lecturers, stakeholders in society); organizational structures; social relations and cultural aspects; physical and technological facilities; and activities and approaches (i.e. working tasks, learning activities, and didactic or pedagogic approaches*". However, the terminology of hybridity mainly stems from the professional vocational learning and workplace learning domains, often referring to the interface between school and the workplace learning [16]. [16] also developed design guidelines for this type of hybrid learning configurations. In this study [17] we explored how the various social contexts children with SLI are interacting with (at school, at home, and at leisure) could be bridged with the help of technology and pedagogy, in order to develop their communication skills and gain self-insight through reflection on their personal critical communication incidents.

2.2 Supporting development of self-awareness

In order to improve communication skills, a certain degree of self-awareness of the personal mastery level of these skills is necessary. Self-awareness is the capacity of becoming the object of one's own attention [18]. In this state one actively identifies, processes, and stores information about the self. Self-awareness positively affects reflection, self-regulation, self-efficacy, self-confidence, inners speech, self-recognition and accurate knowledge of ones abilities and talents [19]. Self-awareness can be facilitated through three mechanisms [18]. First, through physical stimuli representing oneself and ones behaviour, such as mirrors, texts, video, photo or (social) media. Second,

through the social environment that complements ones inner self-image with feedback, (types of) listeners and alternative perspectives. Third, the inner speech and imagination of a person that complements ones self-image. The capability of inner speech of children with a language impairment is less well developed, which may negatively affect their development of self-awareness. Previous research showed that children with a language impairment often suffer from low self-esteem and an unreal negative self-image of their capabilities [20], especially on the domains of social acceptance, study skills and their conduct [21]. To develop a realistic self-image of their communication skills, self-awareness of their mastery level of these skills is needed. By facilitating feedback from their social environment and by providing physical stimuli on their personal experiences self-awareness can be developed. A digital reflection tool with specific functionality supporting these processes could assist children with a language impairment in developing an adequate self-image and become more self-aware of their activities and conduct.

2.3 'Capturing' critical incidents to learn from experience

In order to develop a realistic self-image and facilitate self-awareness, a personally experienced critical (mis)communication incident should be captured, to both facilitate children's retention of this contextualized moment and enable individual and collaborative reflection. This can be done by supporting children in the creation of an artefact of this incident. An artefact is an artificial representation of an event that can facilitate recall and make implicit knowledge, skills and contextual factors around a critical incident explicit [22]. This can facilitate more concrete, specific, effective and explicit reflection on the incident [23]. A critical incident is an important incident in the life of a student that effects crucial decisions. These incidents can lead to decisions, changes, actions and or reflection and have a lasting effect, as these moments are memorable and powerful for a learner [24]. Critical incidents are not intentional or planned. They offer an individual the opportunity to reflect on events that happen 'spontaneously' and can contribute to insight and contribution of meaning to knowledge and skills [24]. Also [25] describe that critical incidents can facilitate reflection through an elaborate description and analysis of the event in a specific context. The presence and consideration of this context enhances the active knowledge construction and involvement of a learner, with a more lasting effect [25]. The interpretation of the value of an incident and personal feelings of urgency to change determines whether a moment is critical [24, 25]. The urge to understand others and the world around them and to express oneself, combined with the difficulties children with a language impairment experience herein, make (mis)communication moments and conflicts a critical incident to them. It is important that a critical incident is described in a storytelling manner, however in a factual report mentioning concrete behaviour, as this makes it interpretable for all stakeholders, opposed to general opinions and impressions [25]. In this factual report the situation is described, the actions and activities that happened, the objective(s) of these activities, experienced emotions and the consequences of the critical event [25]. For children with SLI it is important that this report is textual, opposed to auditory, as spoken language 'evaporates' quickly, due to a hampered short term memory of children

with a language impairment [26]. This factual report forms the artefact [22] and physical stimulus [18] that can be used within a reflection process in order to improve self-awareness and insight in and mastery of communication skills. It also makes the information findable, retrievable and usable over time by various stakeholders, making a child development explicit.

2.4   Supporting reflection on critical incidents

Various definitions of reflection exist. Based on several definitions [11, 22, 23] and the analysis of [27], who compared existing definitions and distilled several core characteristics, we here define reflection as a conscious, goal-directed activity, in which a person looks back at a personal experience in an earlier situation. A gap between what happened in this situation and what ideally should happen is identified. Hereby insights and awareness is gained in how the discrepancy between the actual and the ideal situation can be reduced, so that these insights can be used in a comparable situation. Concluding, reflection can happen through the occurrence of an unusual situation of can be stimulated externally, involves assessment and evaluation of a (personal) experience, convincement or knowledge and entails looking back critically to earlier actions [27]. To facilitate reflection, we grounded our design on the cyclic reflection process of [11], based on work of [28], which involves 1) an action or event, 2) a personal experience of this action or event 3) the conscious retrieval of the action/event, associated with a concrete personal experience of this event, 4) analysis leading to awareness and insights 5) processing of insights/awareness 6) deciding on how to act 7) personal (revised) action. In order to prevent rumination [29], where learners only focus on their faults and become overly critical and judgmental on their behaviour, reflection is positioned in a broader social context and involves individual and collaborative reflection with stakeholders. This facilitates understanding, analysis and problem-solving behaviour [29, 18].

2.5   The development of the digital reflection tool

The digital reflection tool was developed grounded in the literature above. The tool contains descriptive questions and a possibility to add photo's to reconstruct the critical incident by creating an artefact [22]. This artefact forms the physical stimulus that can support self-insight, through individual and collaborative reflection [18]. This reflection process is supported by the tool through reflective questions, which together form the social context that provides feedback [18]. The reflection process is based on the cyclic reflection model of [11]. The reflection tool contains support for every phase of this reflection cycle: tep A; the children experience a (mis)communication. Step B; descriptive questions and photo's help them to reconstruct the situation into an artefact Step C1; reflection questions help to analyze the situation, as described in the artefact Step C2; feedback of another is acquired through a conversation about the artefact, to gain additional insight in the situation. Step D; tips and tops provide additional information on controlled and yet to practice communication skills. Step E; a description of what action will be taken in the next comparable situation. Step F; is the next action

taken, an opportunity to start the reflection cycle once more. Each step forms a new page in the tooland provides writing spaces. This information is stored, so that it can be consulted for future reference when confronted with a comparable critical communication incident.
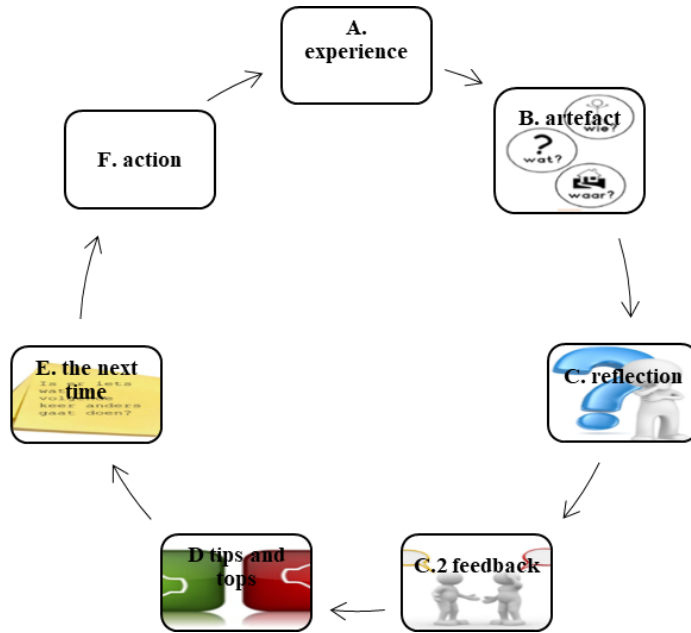

Figure 1: Screenshot of the reflection steps in the reflection tool.

After using the tool repetitively children form a clearer concept of their role and performance in various communication situations, which help them to improve their communicative skills.

3   Conclusion and further work

This paper outlines the design considerations, from a theoretical stance, of a digital reflection instrument to support children with SLI to learn through reflection from critical (mis)communication incidents they experience across the various social context they engage in. Insights from literature on mobile seamless learning, hybrid learning environments or configurations, development of self-awareness, critical incidents and reflection where combined to inform the design of the digital refection instrument.

The purpose of the digital reflection instrument is to support children with gaining self-awareness of their role in these critical incidents and their personal mastery of communication skills and to help them develop their communication skills. This is done by supporting them in capturing incidents in the context they experience them in through the creation of an artefact and by sharing this artefact with stakeholders across formal

and informal social environments, and by facilitating an individual and collective reflection process on these incidents. We furthermore developed the digital reflection instrument with stakeholders and evaluated its effectiveness in daily educational practice. However, this will be described in future work.

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