

On importance of young learners' cognitive abilities: the Fourth Industrial Revolution's perspective

Gunta Rozina^{a,1}, Indra Karapetjana^a, Marina Losevica^b

^aUniversity of Latvia, the Faculty of Humanities, Riga, Latvia

^bUniversity of Latvia, the Faculty of Medicine, Riga, Latvia

(submitted: 6/7/2023; accepted: 18/7/2023; published: 31/10/2023)

Abstract

In compliance with the priorities determined by the Fourth Industrial Revolution, the present article attempts to address selected aspects that pertain to the role of young learners' cognitive abilities, which are brain-work related skills that individuals develop. This study is interdisciplinary in nature and is backed up by selected theoretical contributions that pertain to meaning construction in language use in intersection with the analysis of slight cognitive level impairment instances, which might result in learners' language perception and production difficulties, where slight cognitive impairment is understood not as illness but as a signal of speaking or comprehension problems, behavioural and mood changes, or memory and concentration fade. Several factors can cause manifestation of slight cognitive impairment in the processes of language perception and production. To investigate why several traits of this impairment type might develop in learners, the authors of this article have studied selected instances that refer to spoken language disorders in a sample group of young learners who were brought up in Latvian repatriate families and who repatriated to Latvia from western countries in the period between 2021 and 2022. As a result, the study has drawn its conclusion: within the framework of the tasks set by the Fourth Industrial Revolution, young learners' cognitive ability manifestation enhances their role in society and depends on: a) objective factors, for example, background knowledge of spoken language production principles, b) subjective factors, for example, language procession adequacy, which in certain groups of learners might be lowered due to some factors deriving from slight cognitive impairment.

KEYWORDS: Fourth Industrial Revolution, Cognitive Abilities, Cognitive Impairment, Spoken Language Disorders.

DOI

<https://doi.org/10.20368/1971-8829/1135861>

CITE AS

Ronzina, G., Karapetjana, I., & Losevica, M. (2023). On importance of young learners' cognitive abilities: the Fourth Industrial Revolution's perspective. *Journal of e-Learning and Knowledge Society*, 19, 30-35.
<https://doi.org/10.20368/1971-8829/1135861>

1. Introduction

It is generally known that the 21st century foresees fundamental changes which should be introduced to enhance the role of the newly acquired learners' abilities, including digital competences, to promote their involvement, social inclusion, and participation not only in national-level commitments, but also in global political, environmental, and economic

activities, such as employment, leadership, management and alike. In fact, this century is described as a century of digital governance, known as the *Trusted Web* (Cofta, 2010), where advanced cognitive abilities and digital competences promote successful performance in a broad array of professional sectors of work. Several writings on the Fourth Industrial Revolution (e.g., Schwab, 2016) note that fundamental changes in society mean much more than mere technology-driven transformations. They characterize new opportunities and are concerned with social inclusion of a broad spectrum of people from different layers of society, different ability groups and statuses including.

Klaus Schwab, the founder of the World Economic Forum, introduced the term the *Fourth Industrial Revolution* in 2016 and characterized it as "a revolution that will fundamentally alter the way we live, work and relate to one another" (Schwab, 2016, p. 7).

¹ corresponding author - email: rozina.gunta@inbox.lv

The Fourth Industrial Revolution has been introducing enormous and far-reaching economic, social, and cultural changes in society, and it has exerted profound impact on people's livelihoods. At the same time, Schwab (2016, p. 16) voiced concern about inequality if people are not empowered to deal with rapid technological changes, which impose enormous demands on people's education, which in turn "pose serious challenges to education systems" (Bikse et al., 2022). Thus, the education sector has an important task to ensure that children have well-developed digital competences.

However, one should not downplay the role of young learners' cognitive abilities to face the current and future technological challenges. Therefore, the present study investigated the likely effect of the Fourth Industrial Revolution on language and cognitive development of children by studying the cases of repatriate young learners in Latvia, a country with the population of 1,875,757 in 2023. The choice of the target population has been determined by the diaspora policy which emphasizes the importance of return migration (Plan for Work with the Diaspora for 2021-2023, 2021).

In Latvia context, the present time tendencies demonstrate two distinct groups of repatriates. The first group comprises those who left the country in the late 1990's and at the beginning of the new millennium, which was a period marking a considerable number of Latvia citizens immigrating to such countries as England, Ireland, Norway, and Belgium to satisfy their social, employment, and financial needs. The second group comprises those who have completed their service in a variety of advisory, banking, counselling, and diplomatic positions in such countries as Belgium, France, and Luxemburg and have returned to their former communities in Latvia.

In the diaspora policy document *Plan for Work with the Diaspora for 2021-2023*, it is stated that at the beginning of 2020, the size of the diaspora was approximately 373,000 people, "including persons of Latvian origin and their descendants in the USA, Australia, Canada and some European countries. In the period from 2013 to 2019, the total number of immigrants in Latvia was 68,536 people, of whom 38,857 were remigrates (on average in one year - 9,791 immigrants, of whom 5,551 were remigrates)" (Central Statistical Bureau, Republic of Latvia, n.d.).

Pre-school and school-age learners who were brought up in Latvian-origin families but resided in foreign countries are often faced with integration problems in the educational environment of Latvia due to spoken language perception and production problems, which young learners from repatriate families experience when communicating in educational settings. Therefore, the present analysis is interested in looking beyond mere developmental processes and enhancement of technology-driven skills: its research

focus is on examining selected underlying reasons that express its authors' presuppositions on how individuals referred to as lower-ability learners, i.e., those who need external assistance to develop as individual learners, can contribute to society, and, thus, can be stimulated and involved in its complex developmental processes. Considering the importance of an inclusive educational environment to satisfy the goals addressed by society, this study has posed its research question:

What reasons underly repatriate young learners' spoken language perception and production difficulties in language use in social environment?

2. Materials and Methods

2.1. Materials: theoretical background

It was an American descriptivist E. Sapir who supported the idea that the social context and people who perform in this context, in a way, encourage and promote the creation of linguistic production. E. Sapir held the view that the linguistic representation and language perception can be promoted if two aspects are considered: the physical aspect, namely, the geographical area, and the societal one, namely, the language being a social phenomenon. E. Sapir stated that "if the characteristic physical environment of people is to a large extent reflected in its language, this is true to an even greater extent of its social environment" (quoted in Fill & Muhlhauser, 2007, p. 17).

Research interest in meaning creation is not a recent one. Drawing on the American structuralists' contributions (e.g., Chomsky, 1965, p. 15-18), the central focus point that determines meaning creation in a language is a set of grammar rules, which govern a language at semantic, syntactic, and phonological levels. These levels create meanings or "senses" of the language (*ibid.*). As regards language acquisition processes, the structuralists stated that language acquisition is an in-born capacity of a human being, where a language relates to an established mental phenomenon; thus, language perception and its production should be viewed as interrelated activities with no relation to its social function of use.

Research findings acquired by the linguistic philosophers at Oxford University (e.g., Austin, 1962) stated that meanings of sentences relate to specified linguistic functions of a language (e.g., to express a request, to argue) and the use of linguistic functions, known later as speech acts, fulfil the language users' communicative needs. Appropriate and relevant use of language demonstrates that an individual has perceived and understood the expressed linguistic implications. The functional perspective on language use was associated with the view (e.g., Halliday, 1973, p. 38-39) that language use depends on the interface of semantic rules and general conditions that determine the

communicative language use in each context. In other words, a semantic meaning of utterance can be explored if it is viewed in relation to the communicative situation of use. Leech (1983, p. 10-13) marked that linguistic communication is concerned with both the use of formal language systems and conventional implicatures that can be derived from word meanings in the context of their use. Thus, communicative language use depends on internal language aspects, i.e., grammar rules, and on external language aspects that depend on the social functions of language use.

In addition, it should be noted that several layers of society exist, namely, those who perceive and produce language with a marked eloquence and those who suffer from spoken language disorders that might have occurred in different periods of life, early childhood including. For the study purposes, the present article has established its working definition for the concept *spoken language disorders*: these are slight impairments in language acquisition and in its contextual application due to language comprehension deficit and marked limitations in spoken language production when conventional rules of sound construction, morphology, sentence construction and meaning construction in a language should be observed.

To analyse the instances of spoken language disorders, this study was concerned with the latest contributions of clinical pragmatics, which, being a relatively “recent science” (Cummings, 2005), examines specific cognitive conditions that underlie language disorders, inter alia, the perception and production of a spoken and written language across one’s lifespan, the analysis of how language knowledge is acquired and how the communicative needs of a person are met. It is generally accepted that language production and comprehension is not only related to the neuroanatomical structures of the brain that are responsible for language abilities of a person, but they are also related to the linguistic disciplines that determine how language knowledge is acquired and how the communicative needs of an individual are satisfied. However, if an individual suffers from, e.g., clinical speech pathologies, text (discourse) construction disorders, or from cognitive deficits, he/she can hardly cope with making sense of a statement. For example, individuals having developed phonological disorders or those with special language impairments can hardly identify meanings created by a sound system, or they can identify semantic mappings in a text (e.g., semantic fields) with difficulty. Coping with paradigmatic meaning relationship (e.g., use of idiomatic or metaphoric language) is a difficult task as well because such language use, as a rule, requires advanced cognitive skill involvement. Besides, a range of verbal and non-verbal behaviours, known as communicative appropriateness (Penn et al, 1988, p. 3-17), enable an individual to assess the language skills

demonstrated by another language user. This means that not only the use of formal language features but also the language strategies employed ensure a communicative event (Cummings, 2014, p. 23).

Thus, it can be claimed that spoken language perception and production incorporates a variety of linguistic abilities at the levels of sound construction and perception, morphology, sentence meaning construction and speaker’s meaning construction.

2.2. Methods

From a research approach perspective, this study deriving from the “focus on meaning and understanding the phenomenon” (Glatthorn, 2018, p. 34-35) was a qualitative study because “the study bearing features of empirical nature [...] is concerned with exploring and describing a phenomenon” and thus, it is referred to a case study type because “a case study [...] investigates a contemporary phenomenon within its real context” (ivi, p. 37).

From the perspective of research methodology design and to analyse why repatriate young learners experience spoken language perception and production difficulties in language use when it is applied in social environment, the authors of this study made use of:

- two types of *secondary sources*: a) theoretical contributions on cognitive abilities, cognitive functions and language verbal functioning (e.g., Regan 2018), on cognitive disorders (e.g., Cummings 2015; Cummings 2005), and on communicative situations of language use (e.g., Leech 1983), b) Latvia-related research findings obtained at Riga Stradins University (Latvia) on considering such aspects as communication patterns held between a physiotherapist and a patient (Rozenbergs et al, 2018), attention deficit disorders and cognitive impairment cases (Devjatnikova et al, 2020), and
- *primary sources*: a representative sample of 12 young learners between 5 and 10 years of age, who with their families repatriated to Latvia from several countries in the period between 2021 and 2022, formed the research population. The study analysed anonymised health-care reports drawn up by healthcare personnel and communication specialists. The cases under analysis were marked as Case 1 and Case 2. Case 1 characterized the young learners who were not referred to the *State Support Programme* upon repatriation to Latvia and, thus, did not receive the state’s support for integration and/or social inclusion. Case 2 characterized the instances when the repatriates’ children were referred to the *State Support Programme*, which functioned within the framework of a European Social Fund project and was conducted by researchers from the Faculty of Medicine, University of Latvia, one of them being a co-author of this article. As a result, several specialists, such as speech pathologists, psychiatrists, psychotherapists, and social workers contributed to

the social inclusion of young learners and to their involvement in educational, social, and emotional processes or contexts.

Considering the research methodology characterized above, it should be noted that this was a small-scale study. On the one hand, it was conducted to gain some deeper understanding of linguistic and cognitive level disorders that might develop in children who were brought up in the repatriate families when young learners started using the national language when attending schools in Latvia. On the other hand, the study reconsidered some of the factors that could pose obstacles for handling spoken language production and perception disorders in contextual language use.

3. Research Discussion and Results

3.1. Discussion

The analysis was conducted to find out how young learners dealt with meaning construction in communicative situations of language use, how they stated their communicative intentions, how they established conventional communication routines, and what cognitive conditions gave reasons for spoken language disorders that resulted from language perception difficulties. Besides, the roles of learners' parents and peers were considered as well when the study analysed how young learners' self-perceptions were shaped and how their self-presentations, i.e., spoken language perception and production was enhanced.

Case 1

Case study 1 reported on the analysis of young learners' spoken language performance and on social behaviour exposure of pre-school age, 5 to 7 years old, individuals, born in England in mixed nationality families where the Latvian language being the national language in Latvia was not used as a language of communication in the respective families. Having held interviews both with the learners and their parents, the communication specialists indicated several problems that caused spoken language perception and production difficulties, such as:

- a) inability to use language appropriately to communicate ideas in a context,
- b) inability to use various language strategies in a relevant manner,
- c) inability to make smooth interactions to demonstrate the communicative intentions of language users,
- d) incapability to formulate learners' communicative intentions in the communicative contexts,
- e) language impairment instances ranging from stuttering and speech anxiety to poor language comprehension.

Further, to fulfil the language functions for the purposes of meeting the communicative needs in the situational context, young learners were able to ask questions to express their ultimate wishes or wants; however, they were hardly able to use verbal expressions to communicate their thoughts or feelings. In addition, they could hardly communicate factual knowledge which they had experienced; thus, difficulties in describing their observations in a descriptive and emotional way rather than in an evaluative manner were observed.

In sum, the above-stated testified that the spoken language perception processes of Case 1 participants were mostly based on the perception of sensory information (e.g., I/we saw, heard this), rather than on describing their beliefs (e.g., I/we think that this is true/false information), or values (e.g., I/we think that this behaviour is good, bad, wrong). The speech pathologist's observations indicated both young learners' spoken language production disorders and psychological disorders, such as a) learners were unable to display their emotions when they characterized the meaning of words or ideas, b) learners' physical performance and behaviour in the observation period were strongly influenced by cultural assumptions of their parents: the preferences and values regarding to what is acceptable or unacceptable in the communicative situations and contexts often differed.

Case 2

Case study 2 reported on the analysis of 8-10 years old school age learners' spoken language abilities and social behaviour exposures. These individuals were born in England, Ireland, Germany, and Island in mixed nationality families where the Latvian language was the mother tongue of one of the parents, but the national language of the respective country was used as a *lingua franca* in interaction. The learners of this group were referred to the *State Support Programme*, which was developed to promote integration and social inclusion of repatriates' children into Latvia's speech community.

Having held interviews both with the children and their parents, the communication specialists indicated several problems, such as:

- a) communication difficulties where major limitations concerned language use in appropriate contexts,
- b) meaning inferencing difficulties,
- c) word order and sentence constructing difficulties at a semantic level.

Further, the above-mentioned conditions developed the basis for spoken language perception disorders because individuals faced difficulties with interpreting the literal and/or non-literal meanings. In the situations as referred to above, the young learners, for example, experienced problems with understanding time concepts, temporal relations between concepts, misuse

of language functions (e.g., greeting, thanking, apologizing, expressing promise).

As a result, Case 2 analysis demonstrated that spoken language perception disorders resulted in miscommunication because the participants:

- a) failed to perceive the implied meaning of a statement,
- b) were hardly able to share information with the other interlocutors,
- c) failed to perceive the illocutionary force of an utterance, for example:

A: (speech therapist's question): *How was your trip to Riga?*

B: (respondent's answer): *Everyone was healthy in Riga.*

Results

As "meaningful communication does not naturally follow from conversational competence [...], many speakers are inhibited by self-consciousness, lack of self-esteem, fear, and other over-riding emotions" (Apps, 2019, p. 15). That is why, sufficient and far-reaching attention should be paid not only to those young language learners who participate in spoken language production without any hesitation, but also to those who face challenges or experience language perception-production difficulties in language use in a social environment or speech community. Without any doubt, fluent spoken language abilities are based, *inter alia*, on:

- a) cognitive abilities (e.g., Dickens, 2018), i.e., on such multidimensional skills as understanding concepts, handling unfamiliar situations, being knowledgeable about a wide range of topics,
- b) cognitive functions (e.g., Regan, 2018) that refer to learning, memory, attention, and executive functions that refer to perception, thinking, reasoning, and awareness,
- c) verbal fluency (e.g., Regan, 2018) that is displayed through the ability of decision making, memorization of word lists, explaining actions to be carried out.

To involve most of society individuals into far-reaching transformations anticipated by the Fourth Industrial Revolution, to promote the social inclusion of those society members who might suffer from cognitive impairment, spoken language disorders including, conciliatory and sympathetic attitude and careful and meticulous attention should be directed at them. To facilitate the linguistic behaviour of young learners who suffer from spoken language disorders, a broad array of linguistic strategies can be employed:

- a) training learners' language functions: for example, producing appropriate responses which can be expressed through the language functions of clarification or through enhancing the fluency of interaction, which can be expressed through repetition, periphrasis, developing

sociolinguistic sensitivity, which can be trained through the acquisition of language politeness forms, e.g., addressing, parting, and greeting,

- b) developing linguistic strategies in a semantic context, which can be carried out through the language function of topic initiation, text construction, and text cohesion,
- c) establishing fluency of interaction, which can be trained through teaching linguistic structures of repetition or simpler versions of periphrasis,
- d) distinguishing features of non-verbal communication, which can be conducted through, e.g., showing how different facial expressions can be interpreted.

Consequently, it might be assumed that a variety of linguistic strategies can be employed if they are used in cases of slight cognitive impairment. They can be efficient tools to shape, e.g., the linguistic conduct of individuals. Besides, the linguistic interventions can be examined not only through functional language use but also through social language use. In case of spoken language disorders established in an early pre-school period, special emphasis should be laid on developing and expanding a text/message comprehension and production abilities, e.g., through implementing story telling activities.

To sum up, the development of young learners' cognitive abilities can be seen as an enhancing factor that plays one of the key roles in promoting learners' communicative skills. Thus, it might be considered as one of the basic therapeutic strategies that plays a crucial role in treating young learners with slight cognitive impairment. Not only educators, but also medical personnel, e.g., speech therapists and physiotherapists have a great opportunity to exert an overall positive and increasing impact on developing individuals' meaningful communication.

Conclusions

Spoken language perception and production incorporates a variety of linguistic abilities at the level of sound construction and perception, at the level of morphology, sentence meaning construction and speaker meaning construction. Spoken language production difficulties are often caused by language perception inadequacy, which, in its turn, is backed up by cognitive level problems, such as inability to memorize, perceive, understand, and produce language. It has been discovered that several problems are essential for spoken language perception and production, which young learners from repatriate families experience when language is used for communicative purposes in educational settings: a) appropriate language use in relevant contexts, b) difficulties with inferencing the speaker meaning, and c) sentence constructing challenges. Spoken language

production and comprehension is not only related to the functions of neuroanatomical parts of the brain that form cognitive abilities of an individual but also to the linguistic disciplines that demonstrate how language knowledge is acquired and how the communicative needs of an individual are met.

As a result, from the Fourth Industrial Revolution's perspective, the development of young learners' cognitive abilities can be seen as an enhancing factor that plays one of the most crucial roles both in promoting learners' communicative skill acquisition and in enhancing social inclusion of young learners with slight cognitive impairment in relevant speech communities. The implementation of the tasks pertaining to the Fourth Industrial Revolution cannot be successful without considering the importance of young learners' cognitive abilities such as the development of meticulous attention, ability to concentrate, problem solving skills, and planning skills being one of the most important cognitive capabilities for establishing effective and meaningful communication, which facilitates the acquisition of communicative competence. Therefore, appropriate language applied in relevant interactional situations determines language users' linguistic behaviour in a variety of related aspects of linguistic representations.

References

- Apps J. (2019) *The art of communication*. Cornwall (England), TJ International Ltd.
- Austin J. L. (1962) *How to do things with words*. Oxford, Clarendon Press.
- Bikse V., Grinevica L., Rivza B., and Rivza P. (2022) Consequences and challenges of the Fourth Industrial Revolution and the impact on the development of employability skills. *Sustainability* 14(12), 6970; <https://doi.org/10.3390/su14126970>.
- Central Statistical Bureau, Republic of Latvia, Available from <https://www.csb.gov.lv/lv/statistika/statistikas-temas/iedzivotaji/iedzivotaju-skaitis/meklet-tema/2694-iedzivotaju-skaita-MoESainas-latvija-2019>, (accessed April 17, 2023).
- Charman T., Brown-Cohen S. (2000) Testing joint attention, imitation and play as infancy precursors to language and theory of mind. *Cognitive Development*, 15, 481- 498.
- Chomsky N. (1965) *Aspects of the theory of syntax*. Cambridge, Massachusetts, The M.I.T. Press.
- Cofta P. (2010) *The trustworthy and trusted Web. Foundations and trends*. The Netherlands. *Web of Science*, 2 (4), 243-381.
- Cummings L. (2014) *Pragmatic disorders*. Dordrecht, Springer.
- Cummings L. (2015) *Pragmatic and discourse disorders*. Cambridge, Cambridge University Press.
- Cummings, L. (2005) *Pragmatics: a multidisciplinary perspective*. Edinburgh, Edinburgh University Press.
- Devjatnikova D., Riemere K. (2020) *Reliability of the ages and stages 48-month questionnaire for Latvian version*. Bachelor Diploma Thesis. Riga (Latvia), Riga Stradins University.
- Dickens, W.T. (2018) *The New Palgrave Dictionary of Economics*. Accessed 10.04.2023 on <https://www.brookings.edu/wp-content/uploads/2016/06/06/05/education-dickens.pdf>.
- Dijk van T.A. (2018) *Discourse and migration*. In Zapata-Barrero, R. And Yalaz, E. eds. *Qualitative research in European migration studies*. Switzerland, Springer.
- Fill A., Muhlhauser P. (2007) *Language and environment. The Ecolinguistics reader: language ecology and environment*. New York, Continuum, 13-23.
- Glatthorn A.A. (2018) *Writing the winning dissertation*. London, SAGE Publications.
- Halliday M.A.K. (1973) *Explorations in the functions of language*. London, Arnold.
- Leech G. (1983) *Principles of pragmatics*. London, Longman.
- Penn C., Cleary J. (1988) Contemporary strategies in the language of closed head injured patients. *Brain Injury*, 2, 3- 17.
- Plan for Work with the Diaspora for 2021-2023. Order No. 33 of the Cabinet of Ministers of 19 January 2021 Available from *Diaspora Policy | Ārlietu ministrija (mfa.gov.lv)*, (accessed April 17, 2023).
- Regan O. C., Cronin H., Kenny A. R. (2018) *The Irish longitudinal study on ageing*. Dublin, Trinity College.
- Rozenbergs D., Sedlenieks K. (2018) *Communication between physiotherapist and patient with chronic pain – qualitative analysis*. Unpublished conference theses. Riga (Latvia), Riga Stradins University.
- Schwab K. (2016) *The Fourth Industrial Revolution*. New York, Currency Books.