APVV

Obligatory scheme for basic research

Obligatory scheme length is limited to 20 pages

Project title	ReferencesStudy on effective strategies of reading behaviour at the key stages of literacy development
Principal investigator	**prof. PhDr. Oľga Zápotočná, CSc.**
Applicant organisation	**Institute for Research in Communication SAS**
Statutory representative(s)	**Mgr. Barbara Lášticová, PhD.**

1. **Timeliness and the scientific nature of aims and objectives, the scientific level and the quality of the project**

   - Specify the timeliness of the problem solved in the respective field of science and technology from the worldwide point of view including the relevant references to the specialised publications
   - Specify the scientific level of the project and the scientific nature of the methodologies used during the project implementation
   - Specify the project aims and objectives and the feasibility of your aims and objectives
   - Describe the suggested methodology for the project implementation, justify its selection and effectiveness of its use with a view to meeting the declared aims and objectives

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1.1 Timeliness of the problem in a field of literacy theory

Literacy development research is one of the most important and topical themes in education research and is discussed at all education levels. Literacy is a key element of the European development strategy (Europe 2020). Research into this increasingly complex social and cultural phenomenon has a long and relatively rich history. In the first half of the twentieth century, academic research was typically informed by a relatively narrow view of literacy as the individual ability (or inability) to read and write, and it was aimed at identifying the causes of writing difficulties, whereas in the second half of the twentieth century the concept of literacy underwent substantial expansion. This fundamental 'paradigmatic turn' in literacy research was influenced by the **cognitive revolution** in psychology which placed reading at the centre of general cognition; that is, the processes whereby we understand the world. Cognitive models (the most well-known are by Kintsch, Van Dijk, 1978) focused on text comprehension – understood and investigated as an exceptionally complex and multi-level cognitive act (Sadoski, 1999). Soon after, intense research began on cognitive scaffolding (influenced by the pioneering work of Flavella, 1970, 1979); that is, the potential to effectively regulate comprehension via metacognition through the use of conscious reading strategies in understanding and learning from a text (Palincsar, Brown, 1984).

A further important shift in literacy theory occurred as part of the so-called **'sociocultural turn'** associated with the British school of New Literacy Studies (and the work of B. Street, 1984; key US scholars were J. P. Gee, 1989 among others). In Slovakia this stream in education thinking was associated mainly with the Vygotsky School (Petrová, 2008). His main

contribution was to see that reading and text comprehension processes extend beyond the margins of individual cognition. Literacy was now understood to involve wider social, cultural and value aspects (for more on this, see Zápotočná, 2004; 2017); that is, the factors behind its development, which are linked to the external social, cultural and material environment. The individual psychogenesis of literacy is studied in various dimensions (Kucer, 2002) and along relatively long age continua, including the most important one, **preschool age** (Neuman, Dickinson, 2001). When applied to the teaching of risk groups – children at a social, cultural, economic, language or other disadvantage – these approaches are more culturally sensitive and constructive all round (according to Gordon, 2009). They have a substantially wider and richer explanatory potential, especially given the growing socioeconomic, cultural and language diversity of the learning environment (Nocon, Cole, 2009). Last, but not least, part of the sociocultural turn in literacy theory involves a marked differentiation in functions; that is, in understanding literacy as a **plurality of literacies** associated with various areas and functional uses of literacy ('multiliteracies', see Harris, Hodges, 1995) and a growing need for, or indeed necessity of, **interdisciplinary** research, especially that based on a **qualitative methodology.**

The most significant cultural change accompanying this most radical shift in conceptions of literacy is unquestionably the proliferation of ICT. It is now a fully established part of academic discourse – as the so-called **'digital turn'** (Mills, 2010) – and has been developing in various forms since around the beginning of the millennium parallel to the increasing mass informatization of society and education institutions. Slowly but surely, what contemporaries call an 'epochal' (Coiro, Knobel et al., 2008) or 'paradigmatic' change (Rankov, 2006) is occurring in the evolution of civilization.

The new media environment is being strongly promoted, particularly among young people, and is very forcefully and competitively forcing out reading as an activity, leading to an often irreversible change in their media preferences and attitudes to traditional media. One of the undisputed effects of this – apart from the overload of new media content – is the loss of certain generic skills that are developed through reading (alone). All this has corresponding economic, sociocultural and (according Bauerlein, 2010; Carr, 2011; Spitzer, 2014) cognitive psychological consequences.

According to Mangen and Weel (2016), the ongoing decline in (or total cessation of) reading more extensive print texts (as shown in PISA, PIRLS, TIMMS) partly reinforces reading habits in which users engage in random, passive interaction with a text and that have a negative effect on various cognitive and non-cognitive aspects of reading. Online reading is becoming more superficial, interrupted or fragmented to the detriment of in-depth reading and comprehension (Mangen et al., 2013).

Paradoxically, with the growing reading demands in the new media environment that, besides the growth in both the quantity of information and in the qualitative differences of nonlinear hypertextual information, require new alternative reading strategies, we are seeing a loss of traditional reading skills. However, these are, as many research findings have shown (Cho, 2013; Zhang, Duke, 2008; Anmarkrud et al., 2013), the primary (although not the only and not a sufficient) condition for effective information behaviours in ICT. Moreover, compared with traditional texts, internet-based information relies more on multimedia cognitive representations (such as pictures, videos, animations, simulations and interactive games), which are especially appealing to young users, but these tend to disrupt in-depth reading comprehension (Duchoňová, 2017).

In any case, what is clear is that the massive changes in the digitization and informatization of society are accompanied by enormous growth in the volume of **research**, which is (according to Kuiper et al., 2009) incredibly heterogeneous, based on different theoretical starting points and leads to a great variety of findings and interpretations. The solutions relating to literacy and reading are aimed (according to Mangen, Weel, 2016) at seeking more comprehensive models of literacy and reading behaviour, including 'web reading' requirements. The multidimensional methodological framework for researching reading in its new context

(human–technology interaction) suggested by Mangen and Weel integrates (among other things) the cognitive, emotional and sociocultural dimensions of literacy (1), facilitates **transdisciplinary research collaboration** (2), combines tested methods with far more **sensitive research tools** (3) for thinking about existing knowledge on reading (4). The knowledge that has been built up is not being lost – in their view – but its 'life validity' (Mills, 2010) requires new approaches and research paradigms.

Observing eye movements during reading

In the Slovak academic literature, eye movement studies are appearing with increasing frequency (see Buzová, Hrdináková, Regec, 2019; Hrdináková, Buzová, 2019). However, the eye tracking method (ET) has not yet been used in reading research in Slovak language culture. Nonetheless, numerous reading studies in which the technology has been used indicate it has multifaceted research potential. According to Anson and Schwegler (2012), ET is an exceptionally sensitive and technologically sophisticated tool which opens up entirely new research possibilities, as it enables the researcher to penetrate the hypothetical cognitive psychological mechanisms involved in reading and information processing. It is of great heuristic value, especially when combined with traditional quantitative and qualitative methods. Whilst bearing in mind its methodological potential and limits, ET can be of use in testing the validity of existing knowledge on reading, and raises a number of hitherto unexplored questions and topics relating to the research on traditional linear reading and 'online' reading in particular (Buzová, Hrdináková, Regec, 2019, s. 122-123).

In the existing ET research, a wide range of different manifestations of reading behaviours have been studied and recorded at various stages of reading development. The relationship between the various components of reading has been investigated, reading diagnostics have been made more accurate and the effects of interventions have been surveyed, among other things. According to Foster et al. (2017), eye movements consistently reflect a whole spectrum of reading skills (from word identification to fluency and understanding to more complex reading skills), changes in developmental profiles, and the nature of these in children with reading problems. ET is of ground-breaking importance in investigating reading comprehension (Rayner et al., 2006) in terms of depth (Salmeron, Naumann, 2017), quality (Strukelj, Niehorster, 2018) monitoring potential (Kim et al., 2018) and metacognitive control (Reichle, Reineberg, Schooler, 2010), by means of different reading strategies and types (Catrysse et al. 2018), depending on the nature of the text and in different media settings.

As regards our own project, it is important to study **the potential uses of ET at the prereading** stage of literacy development. Research investigating this developmental stage helps confirm the impact of the stimulating environment, its effectiveness and potential efficacy. The characteristics of the stimulating literary medium have been explored in relation to their importance for print and word design and for developing text comprehension (Lin, Ghen, et al., 2018; Zhao et al. 2014), while the role illustrations play in representing the narrative has also been investigated (McConnell, 2015; Hoel, 2015), not to mention the importance of the text itself, the influence of specific text genres and the way in which the literary content is communicated. Special attention should be paid to researching the format in which the literary narratives are delivered and children's cognitive and noncognitive emotional responses (exploring the specific effect of literary communication as compared with the competing audiovisual mode, Hrdináková, 2017). One reason for using ET technologies at the preschool age is the problem researchers face regarding the validity of subjective answers when investigating most of the developmental phenomena in children of this age; that is, their ability, or lack thereof, to verbalize their experience, both emotionally and cognitively. ET technology has the potential to capture these processes at the implicit level – before they are fully reflected (Paulus, Proust, & Sodian, 2013).

Insofar as the **spectrum of literacies** that are the focus of our project are concerned, the empirical research will focus on investigating various indicators of early language literacy in relation to reading development in schools from the perspective of the long-term development

of reading and information literacy. Justification for this is found in findings that indicate it is essential to support traditional forms of reading and reading literacy as a key foundation to successfully developing subsequent information behaviours (see Hrdináková, 2007; Zápotočná, 2016, HA). The timely importance of researching these literacies is evidenced in the international reading literacy assessments (PISA, PIRLS, TIMSS etc.), results, education policy interpretations and important education challenges.

1.2 The scientific level of the project and methodology used during the project implementation

This project is a response to a number of the above-mentioned trends and reflects the current areas of literacy research. It is interdisciplinary in that it brings together knowledge from preschool and primary education, from developmental and cognitive psychology, and from contemporary thinking on the crucial importance of modern library and information sciences (Coiro, 2003, 2011). It is in this latter field that the concept of information literacy began to develop in the 1970s (Zurkowski, 1974). The benefit of researching current forms of literacy lies in the fact that it brings existing knowledge together with the specific perspectives and research tools used in these disciplines. These disciplines are reflected in the composition and academic profiles of the research team (described in more detail in Part 5), and in the content focus of the project (describe in more detail in Part 2). Methodologically, the most important feature of the project is probably the longitudinal research involving the same sample of children at key stages of literacy development, in the final years of preschool and early years of primary school. The new methodological aspect of the project lies in researching the potential uses of eye tracking to shed light on the developmental mechanisms of reading and on various manifestations of reading and information behaviours, depending on the nature of the text, mode of presentation and level of reading ability, while studying factors in the education setting and the family's socioeconomic conditions.

1.3 Objectives of the project and feasibility of project aims

The project is focused on research of specific developmental potential of the language, literal and cultural rich education environment of the preschool and its importance for early literacy development in the transition from preschool to primary school.

The main aims of the projects are:

- identification of key indicators of early literacy development (The research will focus on those indicators of literacy development that are significantly shaped by the social and cultural environment, depending on the broad spectrum of language experiences associated with reading or that show an increased sensitivity to the risks associated with socioeconomically restrictive environments.);
- verification of predictive validity of selected literacy indicators in the sample of preschool and primary school age children from preschools demonstrating excellence in the medium-term perspective;
- monitoring of the quality of preschool education (confrontation of experimental group of children from excellent preschools with their peers in the preschool and primary school age).

The partial aims in relation to the monitoring of educational environment of nursery schools are:

- to investigate the direct effect of targeted interactive reading activities during work on narrative and educational texts; the quality and intensity of reception during literature communication will be directly investigated by recording eye movements using the eye tracking method in relation to presentation mode (reading vs. audiovisual);

- to investigate the reciprocal relationships and development profiles of the literacy indicators in experimental and control groups;
- to investigate the long-term effects of the education environment in relation to subsequent reading literacy development (emphasis on comprehension, metacomprehension, reading strategies and narrative skill level) and academic success as the key determinants of effective information behaviours.

An important **methodological aim** is to test the potential uses of eye tracking in investigating the psychological mechanisms involved in reading and literacy development within the Slovak language culture in relation to the characteristics of the information medium (type and format of textual and nontextual information).

1.4 Suggested methodology for the project implementation, the effectiveness of its use in relation to the declared aims

Methodological plan: This project concerns the medium-term longitudinal monitoring of the same group of children in their last year of nursery school and their first year of primary school with cross-sectional research of two groups of children of the same age (from excellent nursery schools and control groups).

Selection of research sample will be based on a detailed survey of the characteristics of the preschool education (and indicatively the social) environment. The nursery school selection criteria will be based on implementation of the State Education Programme (ŠVP, 2016), including the newly elaborated conception of the Language and Communication education area (Zápotočná, Petrová, 2016), which is aimed at the systematic and targeted development of early language literacy. The programme has been in place since September 2016 and as part of an ongoing research project (VEGA, no. 2/0134/18) the researchers will be monitoring a selection of nursery schools during the 2018/2019 school year (teaching observations and teacher interviews), and preschools demonstrating excellence in following the programme will be selected. The sample of children attending these preschools will be monitored at the end of nursery school (2021) and then during year 1 of primary school (2022). An important part of the methodological research plan is to ensure that the literacy development indicators of the two reference groups are comparable. The first reference group will be composed of the last children to follow the previous preschool education programme (ISCED-0, z r. 2008), who were monitored up until the end of nursery school in June 2016 (N=329). The second reference group containing pupils in year 1 of primary school will consist of peers from nursery schools not included in the excellence sampling.

In order to determine the number of participants in the research, we have realized a priori statistical power analysis of expected effect size (Chow, Shao, & Wang, 2017) for expected effect size r = 0.4, α (two-tailed) = 0.05 a β = 0.2. An experimental group of children from kindergartens demonstrating excellence in following the programme will contain 80 children (where a 10% decrease due to medium-term longitudinal follow-up is included). A sufficient number for a control group is 167 children. From a sample of 80 children will be randomly selected 35 children, who will also be monitored using ET. The same children will be tested in the kindergarten and in the first and second year of the elementary school. In the cross-sectional survey, 35 children from each grade in the primary school will be tested using ET.

The procedure – the choice of the kindergartens and participants, including the research sample size – will allow us to monitor the immediate and long-term effects of the educational environment of the kindergarten and its impact on those parameters of linguistic-cognitive development (see Section 2.2), which are the key precursors for functional literacy at school (Zápotočná, Petrová, 2017; Urban, 2017) and in the longer term also for an effective reading and information behavior (Hrdináková, 2017).

2. Original character of the project and conceptions of the project implementation

- Specify the originality of the project
- Describe the suggested conceptions of the project implementation and formulate the scientific hypothesis
- Specify the importance of preliminary results, relation of the suggested solution and own published results

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2.1 Specify the originality of the project

In addition to the interdisciplinary approach to examining issues of literacy development (from the perspective of psychological, pedagogical and library-based information science), the introduction of eye-tracking method into the reading research in Slovak language culture, the originality and innovative character of the project should be seen also in its thematic focus. The Slovak academic research into early literacy has thus far tended to focus on the cognitive correlations and predictors of literacy that are important in a view of the prevention of reading failure (Mikulajová, Dujčíková, 2001; Mikulajová et al., 2012). These indicators have only limited validity in relation to later literacy development, as they correspond most to the initial stages of reading competency at the level of decoding skills (such as accuracy, speed and fluency, Tokárová, 2015; Šelingerová, 2018). Current research has confirmed that regarding the long-term perspective of functional literacy development the higher levels of cognitive processing in reading are primarily dependent on a broad scale of other language, cognitive and metacognitive skills (Fricke et al., 2016; Puente et al., 2016). As regards the aims of this project, the concern is primarily to investigate various indicators of text comprehension – in preschool age children at the level of listening comprehension level, to monitor the development of narrative skills, and – what is a completely new area also in the international research – to investigate the development of metacognitive processes at their initial developmental stages. In accordance with latest research findings, in case of stimulating environment, the early precursor of metacognition appear to manifest at the age of three (Balcomb, Gerken, 2008; Lyons, Ghetti, 2011). The importance of these preliteracy competences for reading literacy and academic success has been documented in the predictive and the interventionist research (Callaghan, Madelaine, 2012; Zucker at al., 2013; Anello, 2015).

2.2 Suggested conceptions of the project implementation and scientific hypotheses

In the first stage of the project **text comprehension** will be investigated at preschool age through listening comprehension, that is through understanding the (explicit and implicit) meanings of various kinds of texts read aloud. Various development models (Adams, 1990; Van Kleeck, 1998) show that listening comprehension is a key experience through which children perform a great deal of the cognitive work relating to literacy development. It is not therefore simply a precursor to subsequent reading competency but is a direct part of the developmental stage of the identical processes of the thinking, approaches or even strategies used to understand texts (Prieto, et al., 2016) in later independent reading. However, this only applies in the right conditions. The second, no less important, experience is the social interaction (dialogues, discussions, conversations, debates prompted by questions on and around the text etc.) that accompanies the activity of listening to the texts (Price, Van Kleeck et al. 2009; Vivas, 1996; Lonigan, et al., 1999; Zucker at al., 2013; Anello, 2015).

In this project we will explore the extent to which the level of text comprehension is dependent on, or shaped by, the education environment (in this case the excellent nursery school practice, and simultaneous inspection of the conditions in the family social environment). We will be investigating the levels and processes of text comprehension that these affect or are manifest

in. Our efforts to answer these questions will be greatly helped by our exploration of comprehension in the context of other important indicators and areas of literacy development over the long-term and in relation to various indicators of reading literacy development at an early school age.

The **metacognition** component will be investigated through metacognitive monitoring. According to metacognition development models (Nelson, Narens, 1994), metacognitive monitoring – people's ability to judge how successfully they complete cognitive tasks – is considered to be a developmental precursor to subsequent conscious metacognitive regulation of cognitive performance. The accurate metacognitive monitoring precedes more effective metacognitive regulation in developmental terms (Destan, Roebers, 2015; Dunlosky, Merriman, 2009). Recent research has shown that metacognitive monitoring is already in evidence at preschool age (Balcomb, Gerken, 2008; Lyons, Ghetti, 2011), while implicit metacognitive abilities precede the explicit metacognitive monitoring (Paulus, Proust, Sodian, 2013). Accuracy of metacognitive monitoring corresponds to performance at the time (Urban, 2017; Urban, Zápotočná, 2017) and over the long-term to subsequent school performance (Roebers & Spiess, 2017). In this project, we will explore the relationship between accuracy of metacognitive monitoring, indicated on scales of retrospective confidence judgements, or belief in the accuracy of task solutions (Van Loon et al., 2016), and reading development – focusing on comprehension processes and strategies.

H1: We assume that monitoring accuracy will improve with age (nursery school vs. primary school), and be accompanied by better performance on the text comprehension indictors being monitored during both developmental stages. Children from an experimental group (children from kindergartens demonstrating excellence in following the programme) will demonstrate better monitoring accuracy and better performance than their peers.

H2: We assume that children from an experimental group will manifest better reading strategies and comprehension monitoring followed by better regulation in school age than their peers.

H3: We assume that using ET we will record implicit monitoring of uncertainty in preschoolers sooner than explicit will be provided. Preschoolers will be more accurate in implicit monitoring than in explicit.

The **narrative skills** component and knowledge of narrative conventions will be investigated by studying narrative production. The collection of narratives produced by the children will be used to analyse in greater depth the higher-level language abilities associated with being able to express deeper causal connections, and how they relate to the agent of the causes within the narration produced. These will be identified through a more detailed analysis of the global structure of the narrative and of selected basic and episodic components of the narration. There is a relationship between the complexity of a child's language abilities that can be identified in stories and literacy development (Snow, l99l; Snow et al, 1998; Kaderavek & Sulzby, 2000; Dickinson & Tabors, 2001; McCabe & Bliss, 2003). Narrative ability is linked to the conditions under which it develops, to the amount of experience children have of different text genres and affects success at school (Cain, 2003; Van den Broeck et al., 2005; Nicoloupoulou et al. 2006; Zápotočná, Petrová, 2017).

H4: We assume that the children who obtain better results on the narrative production indicators will also obtain better results on the text comprehension indicators, particularly those linked to the implicit meaning of the text. We also assume that the performance of children in the experimental group will be significantly better than that of those in the reference group (from 2016).

H5: We assume that, children in the experimental group will obtain better results in year 1 of primary school, both on the narrative production indicators and on the text comprehension

indicators when compared with the reference group of pupils attending nursery schools under the 'traditional' regime.

Technologies for **observing eye movements** enable us to capture, to a relatively high degree of accuracy (Rayner, 1998), the way in which children today process information presented in a variety of formats and in different settings, both in the literacy and preliteracy stages, and with the option of making further specifications if problems are noted (Jacob, Karn, 2003). Their use is particular justified in digitalized information and media settings. The experiences of the new 'digital-native' generation of children, exposed to its intense influence from the youngest of ages, are changing the way they read and respond to textual information, and this means new models of reading behaviour are required based on detailed research using more objective measures and more accurate tools (Duchowski, 2007).

As far as the expected benefits of observing eye movements to research this topic are concerned, we assume that the parameters and data outputs of the eye tracking technology combined with the other methods and diagnostic tools will enable us to:

- more sensitively capture the cognitive linguistic competencies under investigation, which – accounting for the limited ability of children to provide subjective responses – will help ensure the results are more objective and have greater validity;
- identify and describe individual developmental profiles of the cognitive and noncognitive processing of stimuli from the information environment (such as individual preferences and strategies for surveying them, length of concentration, attention intensity and selectiveness, emotional response, depth and quality of reception) especially in relation to the text comprehension indicators being investigated;

H6: We assume that children in the experimental group will perform better in spatial indicators (number of fixation, number of saccades, number of regressions, difference of fixation between text and picture) in cognitive-oculomotor measurement than children from reference group.

H7: We assume that children in the experimental group will perform better in temporal indicators (time of fixation, saccades length, fixation length, reading time, reading quotient) in cognitive-oculomotor measurement than children from reference group.

2.3 Importance of preliminary results, relation of the suggested solution to own published results

It is assumed that the project will help validate and enrich existing knowledge on the development of the cognitive linguistic indicators of early literacy being investigated (Zápotočná, 2013; Urban, Zápotočná, 2017; Zápotočná, Petrová, 2017) and of the potential for stimulating them under the specific conditions of the nursery school teaching environment. The ambition is for the project to contribute by raising new questions, identifying key challenges and fruitful themes for further research in view of the current problems associated with the changing ways of reading and working with information (Zápotočná, 2016). Thinking about this will help us build and test relevant reading and information behaviour models (Hrdináková et al., in press).

The project outcomes can also be expected to lead to better quality reading performance diagnostics; to strategies for reading and working with texts at the various stages of reading development and for reading and information behaviours in different information settings; with prospects for their use in designing websites, educational portals and software, for use in ICT based information behaviour interventions (Buzová, Birjaková, 2017).

3. **The structure of the project, the quality of preparation, the logical interconnection of the project procedures**
   - Specify the timetable for the project implementation taking into account the logical interconnection of the procedures and meeting the declared aims and objectives

- Explain the adequacy of the used methodology
- Explain the adequacy of the proposed project budget according to financial demands of accomplishing project goals
- Provide the timetable of the project implementation and for achieving the set aims and objectives

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3.1 Timetable for the project implementation

07/2020 - 04/2021	5/2021 – 6/2023 Data collection	07/2023-06/2024	Post-completion outcomes
Preparation stage	**07/2021-12/2023** **Analytical processing stage**	**Synthesis stage**	

Project preparation stage (07/2020–04/2021)
- theoretical analyses, literature reviews
- methodological preparation and validation of measuring tools
- creation of database containing the reference group data (from 2016–2019)
- selection of excellent nursery schools (consultations, qualitative analysis of observation records, individual interviews)
- obtaining informed parental consent and preliminary information on the teaching location of children in the preschool groups being investigated

Data collection (05/2021–06/2023)
- Testing 1 (May–June 2021) – examination of the sample of children from excellent nursery schools (N= 80); experimental eye tracking testing during literary communication (N=35);
- Testing 2 (February–June 2022) – investigation of the same group of children (N=80) during the second half of year 1 primary school; examination of reference group of year 1 pupils entering primary school from other nursery schools (once informed parental consent has been obtained, N=167); examination of samples (N=35 pupils) from each of the groups using eye tracking;
- Testing 3 (February–June 2023) – use of eye tracking (**ET**) to examine the same group of pupils from the excellent nursery schools engaged in reading activities in year 2 (N=35); cross-section testing of pupils in year 3 and 4 reference groups engaged in reading activities using **ET** (N=35 in each);

Analytical processing and data interpretation stage (ongoing **07/2021–12/2023**)
- Statistical data analysis – consultation of statistical models for processing developmental data;
- Within-group variations (children from excellent nursery schools and reference groups from other nursery schools) will be analysed using Multilevel analyses (MLM), which will enable us to compare large groups of children as well as incomplete data. The relationships between the various language literacy indicators (comprehension, narrative skills and metacognition) will be detected using correlations and through regressive analysis in the next step;
- Using eye tracking technology, data will be collected on the number and duration of fixations and on the saccades (progressive and regressive). It will then be analysed in relation to the relevant area of interest (AOI) for that experiment design. Tobii Studio software will be used to analyse the eye tracking data. The eye tracking data will be analysed both quantitatively and qualitatively in the context of the analyses of the

audiovisual recordings of the respondents, using the modified coding and scoring the reading errors (following Zelinková 2009), evaluating reading quality (following Matějček 1995) and assessing understanding of the text read.
- The statistics will be further processed using analysis of variance (ANOVA) to detect variations in the data obtained via eye tracking and the children's responses to the questions on text comprehension and the metacognitive monitoring. Data from the cross-sectional study of pupils will be processed using mixed ANOVA, possibly MLM depending on the data distribution;
- Ongoing processing of the materials and preparation of analytical studies, presentations at Slovak and international conferences;

Synthetic stage (07/2023–06/2024)
- Work on publishing further outcomes, preparing and editing a single-topic issue of the journal *Gramotnosť, pregramotnosť a vzdelávaní* [Literacy, preliteracy and education] (Issued by the Faculty of Education at Charles University, Prague);
- Organization of an international seminar – panel discussions with experts from Slovakia and abroad, on 'Potential uses of eye tracking in perception and information processing research in the context of knowledge and education: merits of reading literacy research'.
- Popularization of research results

Post-funding project outputs:

Drafting of a synthetic monograph (estimated completion by the end of 2024); final work on an electronic book (in the first half of 2025). Popularization of research results.

3.2 Adequacy of the timetable and used methodology in relation to suggested budget and declared aims of the project

The complex timing of the planned research activities, especially during the data collection stage (given the statistical estimates of the large research samples required), will be resolved with the help of a trained administer. The first two phases of data collection are crucial to fulfilling the main aim of the project – to observe the effects of the education environment on the selected language literacy development indicators. Eye tracking will serve as an additional method, enabling us to record and objectively assess the direct effects of teaching. These activities will be covered by the project applicant's budget (i.e. the principal investigating organization). The third phase will help fulfil the methodological aims of the project related to investigating the potential use of ET technology in reading research. The use of a semi-longitudinal data collection design will – in addition to improving the accuracy of diagnosing developmental profiles of reading performance in relation to the nature of the text and reading materials used – extend the investigation of the development continuum to the entire period of early years schooling. Processing the data obtained will be an important basis for further researching information behaviour in various media settings and web interfaces. These activities will be funded out of the co-investigating organization's budget. A detailed breakdown of the budget can be found in the electronic application (Part VV-C).

4. **Professional qualifications of the principal investigator (in the context of the data specified in the Application, Section VV-A4)**

- Specify no more than 5 the most important scientific outputs of the principal investigator during the last 5 years, indicate their importance at both the national and international levels
- Specify 3 the most important projects implemented by the principal investigator over the last 5 years, regarding to the importance of the project outputs in both national and international context

- Specify the personality of the principal investigator in the respective field of the basic research (in the context of scientific, as well as scientific and pedagogical outputs) at the worldwide level and/or in the European Research Area, as the case may be

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4.1 The personality of principal investigator in the respective field of basic research

The principal investigator of the research is prof. PhDr. Oľga Zápotočná, CSc., an independent researcher at the Institute for Research in Social Communication (IRSC) at the Slovak Academy of Sciences (SAS). She has been researching reading from various perspectives almost since she completed her psychology studies (at the Faculty of Arts, Comenius University in Bratislava, in 1980), so she has direct experience of most of the key paradigmatic changes in literacy theory and research. As part of her cognitive psychology research she has devoted attention to writing disorders as well as visual, perceptual and phonological correlations in reading development at the preschool and early school ages. She wrote a monograph on the theoretical consequences of the sociocultural turn in literacy theory (Zápotočná, 2004) which led her to research the education of the majority population (Zápotočná, 2012) and to investigate literacy in its wider social, cultural and civic and policy contexts (Zápotočná, Lukšík, 2010). She developed a research program in this area in collaboration with university departments in Slovakia and based on her extensive experience of events through being involved in the European committee of the International Reading Association (IRA), which led to her being the main organizer of the Central European Conference on Reading, Bratislava, 2000. She also worked on diagnosing and assessing literacy as a member of the international ELAP team (Early Literacy Assessment Project, EU: Comenius–Socrates, 2001–2002), contributing to the analyses of the first international reading literacy measures (Lukačková, Zápotočná, 2007) and interpreting the results (Zápotočná, 2009; 2011).

4.2 The most important areas of scientific outputs of principal investigator during the last 5 years

4.2.1 Her current interest is researching metacognitive scaffolding in reading, and its effective regulation in the early stages of reading development in school and preschool education. She has published a monograph on the topic (Zápotočná, 2013). Until recently, this was an area that was not covered in the Slovak language culture, not in the research and not in education either. The monograph provided an overview of the research in this area, including that by the author, and this led her to shift her focus to the preschool age group. She has also conducted research on the developmental precursors to the metacognitive regulation of reading, and is engaged in other research by the co-investigators of the project.

URBAN, K., ZÁPOTOČNÁ, O. 2017. Metakognitívny monitoring pri riešení verbálnych a neverbálnych úloh u detí predškolského veku [Metacognitive monitoring in preschool age children completing verbal and non-verbal tasks]. Československá psychologie, 59 (6), pp. 521-535. IF 2016 = 0.242, Current Contents. ADCA

ZÁPOTOČNÁ, Oľga. 2018. Metakognitívne procesy v učení : možnosti ich skúmania a rozvíjania v predškolskom a mladšom školskom veku. In Juvenilia Paedagogica 2018 : Aktuálne teoretické a výskumné otázky pedagogiky v konceptoch dizertačných prác doktorandov. Zborník príspevkov z konferencie s medzinárodnou účasťou konanej dňa 09.02.2018. - Trnava : Pedagogická fakulta TU v Trnave, 2018, s. 14-22. ISBN 978-80-568-0131-4. Typ: AEDA

ZÁPOTOČNÁ, O., URBAN, K., URBAN, M. 2019. Comprehension and metacomprehension in preschoolers from low- and middle-socioeconomic status families. (Submitted to Early Child Development and Care).

4.2.2 In 2014–2016 she was involved in creating the innovative preschool curriculum for preprimary education in nursery schools, and was the author of the Language and Communication teaching area and a whole series of teaching support materials (Zápotočná, O., Petrová, Z., 2014, 2015, 2016). The majority of her research has focused on methodological training and guidance and on conducting impact studies on the higher level cognitive processes of comprehension and metacomprehension, focusing especially on inclusive education for children from socially and economically disadvantaged backgrounds but also children with special learning needs. (This project forms part of her research in this area).

> ZÁPOTOČNÁ, O., PETROVÁ, Z. 2018. Early literacy education in preschool curriculum reforms: The case of post-communist Slovakia. Global Education Review, 5 (2), pp. 145-159. ADEB

> ZÁPOTOČNÁ, O., PETROVÁ, Z. 2017. Raná jazyková gramotnosť detí zo sociálno-ekonomicky znevýhodňujúceho prostredia [Early language literacy in children from socioeconomically disadvantaged backgrounds]. Bratislava: VEDA, 101 pp. AAB

> ZÁPOTOČNÁ, O. 2016. Specifické poruchy učení [Specific learning disorders]. In Inkluzivní pedagogika. Praha: Portál, pp. 348-361. ISBN 978-80-262-1123-5. ABC

> ZÁPOTOČNÁ, O. 2015. Teoretické modely porozumenia textu a ich interpretácie v školskom vzdelávaní [Theoretical models of text comprehension and their interpretation in school education]. In Orbis scholae, 9 (3), pp. 13-26. (Scopus), ADMB

4.2.3 Following on from a research project conducted at the SAS Centre of Excellence, on Citizenship and Participation in Slovakia, she worked on issues related to literacy and citizenship in education. She was the co-author of a monograph and the author of one of the chapters that was part of the outcome of her collaboration on a KEGA project (012-TTU-4/2013, Reflections on the content of primary school teaching from the perspective of developing civic literacy):

> ZÁPOTOČNÁ, O. 2015. Občianska gramotnosť a možnosti jej rozvíjania v etickej, jazykovej a literárnej výchove [Civic literacy and its potential in the teaching of ethics, language and literature]. In Danišková, Z. et al.: Výchova k občianstvu na primárnom stupni. Trnava: TYPI, pp. 140-183. ABD

4.2.4 In relation to the challenges of the 'digital turn' in literacy research, she is conducting research and critical thinking on the polarizing views of 'old' and 'new' literacies, comparing traditional print and new 'online' forms of reading. As part of her international collaboration on COST (action IS1404 Evolution of Reading in the Age of Digitization: E-Read) in 2014–2017, she has been attempting to develop and empirically document the more conservative views on integrating technology into teaching as a natural part of learning, knowledge and literacy development, while maintaining the tried-and-tested basic linguistic, psychological (cognitive, metacognitive and non-cognitive) foundations and their indisputable cultural values and functions (Collin, Street, 2014).

> ZÁPOTOČNÁ, O. 2016. Reading literacy in the age of digital technologies. In Human Affairs, 26 (3), pp. 317-328 (Scopus, The Philosopher's Index, De Gruyter). ADNB

> ZÁPOTOČNÁ, O. 2018. Perspektívy vývinu čitateľskej gramotnosti v prostredí IKT : Potenciálne prínosy a riziká [Prospects for developing reading literacy through ICT: Potential benefits and risks]. In Školské knižnice ako informačné a kultúrne centrá škôl. Bratislava: Slovenská pedagogická knižnica. AFD

4.3 The most important research projects implemented by principal investigator over the last 5 years

- Principal project investigator of VEGA project no. 2/0140/15. Literacy as a tool for the social inclusion of children from socially disadvantaged backgrounds and marginalized communities (2015–2017). Budget: €31,342

This joint project by the Institute for Research in Social Communication at SAS and the Faculty of Education at Trnava University in Trnava concerned the social exclusion of socially disadvantaged and marginalized ethnic minorities. It was based on a theoretical and empirical analysis of two concepts which are thought to be of crucial importance to resolving the issue of

cultural and social inclusion through education. The analysis of the concept of literacy enabled deeper consideration of the issue, its causes and mechanisms, and of the cultural and education stereotypes that contribute to the reproduction of social exclusion, and also pointed to potential solutions. The research on the concept of inclusive education shed light on the form it takes in Slovak education, and its manifestation in the deep contradictions between the political rhetoric on inclusion and practice. Various factors affecting the extent to which the educational environment was pro-inclusive were identified, especially at the level of education actors. The research was of an international comparative nature, which helped build knowledge on the cultural specifics of the reality of educating children from socially disadvantaged backgrounds.

- Principal investigator of VEGA project no. 2/0134/18. The educational and psychological developmental effects of innovations in preschool education (2018–2020). Budget: Planned resources for the full research period: €72,166. Obtained resources in 2018: €6,613.00 (SAS), €3,401 (Faculty of Education, Trnava University);
- in 2019: 6468 € (SAS), 3584 € (Faculty of Education, TU).

This joint project by the Centre of Education Research at the Institute of Research in Social Communication, SAS, is a continuation of the scientific research conducted by investigators involved in designing, developing, implementing and evaluating the State Preprimary Education Programme for nursery schools valid from 2016. The research is being conducted through a series of impact studies following two main strands. The education research concerns the study of processes linked to the implementation of the programme and the thinking and assessments of those directly and indirectly participating in preprimary education, analysed within the interpretational framework of the current expert discourse on preschool education. The developmental psychology strand will focus on investigating various parameters and indicators of language, cognitive and metacognitive development using a sample of preschool children under the specific conditions of the programme, and will help clarify the developmental potential of extending the child's cognitive linguistic potential and assess the effectiveness of the programme, especially within the language and communication education area.

- COST Action 1404: Evolution of Reading in the Age of Digitization (2014–2019).

As a member of the committee she has been involved in tackling issues relating to reading and changes in reading in ICT settings. The expert group of European academics who, established the research agenda as part of this project, focused on the key issues relating to the current project. Z. Petrová, a member of the present research team (see CV, in section 5), was extensively involved in producing one of the outputs of this project (a monograph edited by Barzillai & Thomson et al., 2018).

5. Professional qualifications of the research team

- Describe the competence of the participating research organisations with regard to the submitted project according to the main role each organisation implements in the project
- Describe the competence of individual researchers for the solution of the submitted project and fundamental tasks during the project implementation; (this does not concern the project manager)
- Describe the manner of co-operation of researchers and their mutual complementarity and substitutability during the project implementation
- Describe instruments, equipment and personnel infrastructure of the workplaces participating in the project implementation
- Describe the level of engagement of young researchers up to 35 years including postgraduate students from the respective field of research and development in the project implementation

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5.1 The competence of the participating research organizations with regard to submitted project

The Institute for Research in Social Communication, SAS, has been tackling the issue of the psychology of reading and literacy development since the late 1990s. In 2011 the Centre for Education Research was set up within the institute (a consequence of the addition of two new key staff members, a professor and a senior lecturer in education) and this led to the programme undergoing considerable expansion and consolidation and developing a greater interdisciplinary and education focus. Another advantage was that it acquired accreditation as a centre for doctoral studies in School Education in collaboration with the Faculty of Education, Trnava University in Trnava. A number of PhD theses have looked at literacy issues from various angles. The original psychological focus of the research programme (cognitive development) continues to dominate with pedagogic, social psychology sociocultural and intercultural contexts now featuring alongside. Research relating to the informatization of society and education institutions, accompanying the above-mentioned 'digital turn' in literacy theory and research, has to build on the knowledge potential of other disciplines, especially library and information science. In this project this potential is well-represented among the team of investigators from the top collaborating institutes.

The Department of Library and Information Science (DLIS), Faculty of Arts, Comenius University, Bratislava is the leading centre for library and information science in Slovakia. Its expertise is evident in the research projects it has been awarded, especially those involving international collaboration: DELOS, EUCLID, CELIP. There are two reasons for engaging the department in the project: 1. It has conducted various research projects investigating different aspects of reading: reading strategies, habits and motivations; attitudes and preferences of children and young people (but also adults); comparisons of reading specialist (educational) texts and literature; comparisons of reception of literary and audiovisual narratives; comparisons of reading within the new cultural models and nontraditional media. From a methodological viewpoint, the department has experience of using many different quantitative and qualitative methods: from surveys to observations, interviews, narrative methods, the semantic differential method, reader biographies and so on. 2. The department is well-placed to handle the intense use of the new methodology within the research project as it was the first centre in Slovakia to attempt to use the technology to observe and investigate reading processes. Its contribution to the project will be to provide a unique focus on the direct investigation of the processual aspects of reading, but also to contrast the data obtained with data acquired using other indicators.

5.2 The competence of individual researchers

Associate Professor **PhDr. Zuzana Petrová, PhD.** Senior lecturer in education at the Faculty of Education at Trnava University in Trnava. She studied primary school teaching (Faculty of Education, Comenius University in Bratislava) and philosophy (Faculty of Theology, Trnava University in Trnava). She completed her doctorate in education at the Faculty of Education, Comenius University in Bratislava).

Her research interest is the development of early literacy in children, especially in relation to (written) language, learning and school education. Her previous research findings were used, for example, in drafting the *State Pre-primary Education Programme for Nursery Schools*, and she helped prepare the content for the Language and Communication education area (in conjunction with O. Zápotočná) and with its subsequent implementation into nursery school teaching practice.

Recently she was involved in the publication of a monograph on *Raná jazyková gramotnosť detí zo sociálno-ekonomicky znevýhodňujúceho prostredia* [Early language literacy in children from socioeconomically disadvantaged backgrounds] (co-authored with O. Zápotočná and K. Urban, published in 2017) which looks at the issue of assessing early literacy in children about to attend primary school. She also collaborated on the publication of another monograph, *Learning to Read in a Digital Age* (edited by M. Barzillai, J. Thomson, S. Schroeder and P. van den Broek, published in 2018), contributing to the chapters on 'Affordances and challenges of digital reading for individuals with different learning profiles' (chapter 5) and 'Literacy Education in the Digital Age' (chapter 7).

She is a member of the International Literacy Association (ILA), the committee of the Federation of European Literacy Associations (FELA) and of the International Society for the Empirical Study of Literature (IGEL). She is also a committee member of COST Action 1404 Evolution of Reading in the Age of Digitalization (2014–2019) and COST Action 1410 Digital Literacy and Multimodal Practices of Young Children (2014–2019).

In this project she will be responsible for the following areas: researching narrative skills, preparing the methodological tools, collection and analysis of the narrative production, and the interpretation of findings related to text comprehension in the light of thinking on current issues in digital text reading.

Mgr. Kamila Urban, PhD. She graduated with a degree in psychology from Comenius University in Bratislava and obtained her doctorate in school education from the Education Department at Trnava University. She currently holds a post-doctoral position at the research project centre. Her interests are cognitive, language and, especially metacognitive, development in children. In 2015 she undertook a study visit at the University of Bern in Switzerland, where she developed methods for detecting metacognitive abilities in preschool age children under the guidance of Prof Roebers and Dr Van Loon. The results of her research have been published in various reputable journals and presented at international expert forums (7th and 8th International Biennial Conference of the EARLI Special Interest Group 16 Metacognition, 2016, 2018; CPH 2019: Conference on Literacy).

In this project she will be involved in the methodological preparations and the statistical analysis of the data, and as part of her thematic focus she will be responsible for adapting the measuring tools for detecting metacognition.

Associate professor Pavel Rankov, PhD. Senior lecturer in library and information science at the Faculty of Arts, Comenius University in Bratislava. In 2014–2017 he was senior lecturer at the Institute of Computer Science, Faculty of Philosophy and Science, Silesian University in Opava (Czechia). For many years he has researched reading and information behaviour in children, young people and adults, as well as the effect of the new digital technologies on reading. He has been an investigator on several research projects that produced national findings from across Slovakia on the current state and level of reading, for example, Reading 2003, Reading 2004, Reading 2005, Reading 2006, Reading 2008, organized by the Literary Information Centre; Young People's Reading in Bratislava Region (2006) and young people's reading in Slovakia, organized by a consortium of libraries within the Bratislava Self-Governing Region. He has participated in various research projects relating to people's interaction with information in various areas: VEGA 1/2481/05 – Use of information in information behaviour in education and science (2005–2007), KEGA 3/7275/09 Information studies in relation to web 2.0 and new technologies INWENT (2009–2011), VEGA 2/0182/10 Internet text as a cultural (r)evolution (2009–2012), VEGA 2/0107/14 *Hypermedia artefact in the post-digital age* (2014–2017). He also participated in the Research and Innovation operational programme for the University Science Park at Comenius University in Bratislava – Stage 2, code ITMS: 313021D075. He was the investigator responsible for Trend media multitasking and curriculum for information studies (2013–2014) and KEGA 133/UK-4/2013 Media and information competencies for the knowledge society (2013–2015).

His thematically important publications include a book, *Text a čítanie, mládež a knižnice* [Text and reading, young people and libraries] (co-authored with Hrdináková, Judita Kopáčiková, 2017), and the following articles "Ako mladí ľudia čítajú a píšu internetové texty? [How do young people read and write internet texts?]" (In Bulletin Slovenskej asociácie knižníc, 2017), "Informatizácia sveta od mediácie k virtualizácii a rozširovaniu reality [The informatization of the world from the media to the virtualization and expansion of reality]" (In: Súmrak médií 2, 2016), "Autorské strategie v real person fanfiction: mezi autencitou a fikcí [Author strategies in real person fanfiction: between authenticity and fiction]" (In Literární a knižní kultura v digitálním věku, 2015). He was awarded a prize by the Society of Slovak Librarians: Act of 2009 for researching and interpreting the findings of the project on Young People's Reading in Bratislava Region.

In this project he will be responsible for comparing the different age categories of readers and for the reading profiles at the various stages of reading age. His competencies will include contrasting reading processes in the traditional environment with those in the new digital media environment.

PhDr. Ľudmila Hrdináková, PhD. studied for her degree and doctorate at the Department of Library and Information Science at the Faculty of Arts, Comenius University in Bratislava. Her thesis, *Textual and audiovisual artworks and children's reception of them in today's culture,* looked at child readers of preschool preliteracy age. For many years her research has focused on reading literacy and the development of children's reading within the broader context of information and media literacy. She has taken certified courses through Reading and Writing for Critical Thinking (RWCT) and through the association Kritické myšlení, including Čtením a psaním ke kritickému myšlení [Reading and Writing for Critical Thinking] (2008), Kritické myšlení v MŠ a 1. třide ZŠ [Critical Thinking at Nursery School and Year 1 of Primary School] (2010), Čteme s nečtenáři [Reading with non-readers] (2010). She is interested in and promotes reading in schools, libraries and among parents. She is a permanent member of the research team conducting research on reading among young people in Slovakia (Young People's Reading in Bratislava Region 2007–2008, Young People's Reading in Slovakia 2010–2011 and 2016–2017). She has been involved in research projects: Trend media multitasking and information studies curriculum, VEGA 1/2481/05 Use of information in information behaviours in education and science – VEGA 1/2481/05, KEGA: INWENT – Information studies using web 2.0 and new technologies, KEGA 133/UK-4/2013: MIKS – Media and information competencies for the knowledge society.

She participated in the Research and Innovation operational programme for the University Science Park at Comenius University in Bratislava – Stage 2, code ITMS: 313021D075, where she was co-founder of the reading research and user experience laboratory equipped with eye tracking technology and is the main initiator of children's reading research at the laboratory, which she has been performing since autumn 2017.

Her thematically relevant publications include two books, *Text a čítanie, mládež a knižnice* [Text and reading, young people and libraries] (co-authored with J. Kopáčiková and P. Rankov, 2017) and *Informačná gramotnosť ako kľúčová kompetencia pre 21. storočie* [Information literacy as a key 21st century competence] (2011) and the following articles "Motivácia k čítaniu v časoch bibliofóbie" [Motivation to read in a bibliophobic era] (2017) and "Čítanie v teórii, výskume a praxi [Reading in theory, research and practice]" (In Bulletin Slovenskej asociácie knižníc, 2018), "Prečo by aj (budúci) znalostní pracovníci, experti a výskumníci mali čítať beletriu: kultúrnocivilizačné kontexty výsledkov jedného výskumu [Why (future) knowledge workers, experts and researchers should read fictional literature: the cultural and civilizational contexts of research findings]" (with P. Rankov, In ITlib, 2018), and especially the following studies: "Východiskové teoretické koncepty výskumu čítania metodológiou sledovania pohybu očí [Initial theoretical concepts for research in reading using the eye tracking method]" (with K. Buzová, 2019) and "Metodologické aspekty sledovania pohybu očí v kontexte výskumu čítania [Methdological aspects of eye tracking in the context

of reading research]" (with K. Buzová and M. Regec, 2019). She was awarded a prize by the Society of Slovak Librarians: Act of 2009 for researching and interpreting the findings the project Young People's Reading in Bratislava Region.

In this project she will focus on processual reading models based on eye tracking measurements, contextual and developmental models of reading behaviour in children, as well as the comparative research into literary audiovisual communication in child recipients and narrative content. She will also be co-responsible for methodological preparations for measuring reading processes using the eye tracking method. During the solution of the project she will act as the responsible coordinator of the cooperating organization (DLIS).

Mgr. Katarína Buzová, PhD. obtained her PhD. at the Department of Library and Information Science at the Faculty of Arts, Comenius University in Bratislava. Her research deals with human interaction with information and with digital interfaces in the context of user experience, information behaviours, perception of trustworthy information and information searches. As part of the Research and Innovation operation programme for the University Science Park at Comenius University in Bratislava – stage 2, code ITMS: 313021D075, she was responsible for setting up the reading research and user experience laboratory equipped with eye tracking technology for interaction with digital and physical interfaces. Since September 2017, research has been ongoing at the lab on children's reading, elderly people's perceptions and interactions with websites and services, perceptions of information and internet searches as well as other parts of research.

She participated in the following research projects: APVV: TRA-DICE – Cognitive travels in the digital world of the web and libraries with the help of personalized services and the use of social networks; KEGA: INWENT – Information studies using web 2.0 and new technologies; KEGA: MIKS – Media and information competencies for the knowledge society; VEGA: Modelling the information environment of the digital age; and is currently working on APVV: HIBER – People's information behaviours in the digital environment. She participates in academic conferences relating to library and information studies.

Recent publications of hers that are relevant to the project include the following articles: "Možnosti využitia technológie Eye-trackingu vo výskume používateľov informácií [Potential use of eye tracking technology in information user research]", "Využitie metódy eye-trackingu pri optimalizácii rozhraní webových stránok a katalógov knižníc [Use of eye tracking methods to optimize website and book catalogue interfaces]", and especially the following articles: "Východiskové teoretické koncepty výskumu čítania metodológiou sledovania pohybu očí [Initial theoretical concepts for researching reading using eye tracking]" (with Ľ. Hrdináková, 2019) and "Metodologické aspekty sledovania pohybu očí v kontexte výskumu čítania [Methodological aspects of eye tracking in the context of reading research]" (with Ľ. Hrdináková and M. Regec 2019).

In this project she will be looking at the effect digital and traditional interfaces have on reader strategies and strategies for information searching and processing in the digital and physical environments of children of different reading ages using eye-tracking technology. Furthermore she will be co-responsible for methodological preparations for measuring reading processes through eye tracking.

Mgr. Jakub Fázik, PhD.   From the 2015 he was an internal doctoral student at the Department of Library and Information Science, Faculty of Philosophy, Comenius University in Bratislava. In his dissertation – defended in May 2019 – he focused on monitoring the information literacy of the students of teacher education study programs at the individual faculties of the CU. He has participated in several doctoral and scientific conferences, has published articles and papers on information literacy, information behavior and reading. In the present project, he will be responsible for complete management of the eye-tracking records database.

Mgr. Annamária Brijaková is a doctoral student at the Department of Library and Information Science, Faculty of Arts, Comenius University in Bratislava. As part of his dissertation project, she solves the problem of examining the reception of the text through the method of monitoring eye movements. In the presented project she will be co-responsible for the designing of the ET experiment and the interpretation of ET data.

5.3 The manner of cooperation of researchers and their mutual complementarity

The research team will hold regular meeting to coordinate the various steps in preparing and conducting the research. The SAS site will be responsible for managing the field research in the selected nursery and primary schools, in collaboration with Dr Zuzana Petrová (Faculty of Education, Trnava University), who will be taken on as a temporary internal employee for the duration of the research project. The cognitive linguistic skills data will be examined in collaboration with a team of trained administrators (funded out of Section 7 services). The collaborating organization (DLIS) will mainly be responsible for the methodological preparation and measuring reading processes using eye tracking. All the investigators will participate in the creation and methodological preparation of the reading text masters and information materials, in line with their thematic research focus.

5.4 Instruments, equipment and personnel infrastructure of the workplaces

A prerequisite for a successful project solution and efficient management of the allocated funds is also the technological equipment available in collaborating institution. The department (DLIS) has the following equipment at its disposal: 1. Modern *reading research and user experience laboratory*. It also has the technology to enable the detailed study of individual behaviours manifested when working on a personal computer or with mobile technologies, and during use of the gaze tracker and gaze tracking technology in the physical environment. Department also has technologies for reception of nontraditional (audiovisual) documents and for digital recording and processing observation records of reader behaviour (both receptive and perceptive).

5.5 The level of engagement of young researchers up to 35 years

Mgr. Kamila Urban, PhD., defended her thesis on the topic of 'Metacognitive processes in preschool age children solving cognitive tasks' in 2017 and since then has been awarded a postdoctoral scholarship by SAS from the Štefan Schwarz Fund (2018–2020).

Mgr. Katarína Buzova, PhD., defended her thesis on the topic of 'Credibility as a qualitative characteristic of a website' in 2012 and is now a lecturer at the Department of Library and Information Science.

Mgr. Jakub Fázik, PhD., works as an external lecturer at the Department of Library and Inforamtion Science. In his research - cooperation with the Slovak Pedagogical Library – he focuses on digital literacy.

Mgr. Annamária Brijaková is an internal PhD. student of the Department of Library and Information Science, Faculty of Arts, Comenius University in Bratislava.

Literature (project investigators:)

Buzová, K., Brijaková, A. 2017. Využitie metódy eye-trackingu pri optimalizácii rozhrania webových stránok a katalógov knižníc. *Knižnica*, 18 (1), 6 - 13.

Buzová, K., Hrčková, A. 2017. Možnosti využitia technológie Eye-trackingu vo výskume používateľov informácií / Katarína Buzová, Andrea Hrčková In: Zborník z konferencie Vedeckého parku UK v rámci realizácie projektu

"Univerzitný vedecký park UK v Bratislave - 2. fáza" [elektronický zdroj]. - ISBN 978-80-223-4455-5. - Bratislava : Univerzita Komenského, 2017. - S. 15-28 [online]

Hrdináková, Ľ. 2007. Čitateľská gramotnosť ako kľúčová kompetencia informačnej gramotnosti. In: *Školské knižnice ako informačné a kultúrne centrá škôl*. Bratislava : Slovenská pedagogická knižnica, 37-49.

Hrdináková, Ľ. 2017. Literárne a audiovizuálne naratívne dielo v kontexte recepcie detským príjemcom [dizertačná práca]. Bratislava: Univerzita Komenského.

Buzová, K., Hrdináková, L., Regec, M. 2019. Metodologické aspekty sledovania pohybu očí v kontexte výskumu čítania. In: *Knižničná a informačná veda 28 = Library and information science 28 – zborník KIV.* Bratislava: Univerzita Komenského, 111 – 128.

Hrdináková, L., Buzová, K. 2019. Východiskové teoretické koncepty výskumu čítania metodológiou sledovania pohybu očí. In: *Knižničná a informačná veda 28 = Library and information science 28 – zborník KIV*. Bratislava: Univerzita Komenského, 95 – 110.

Hrdináková, Ľ., Kopáčiková, J., Rankov, P. 2017. Text a čítanie, mládež a knižnice. Košice : Technická univerzita.

Mifsud, Ch., Petrová, Z. 2018. Literacy education in the digital age. In: M. Barzillai, J. Thomson, S. Schroeder, P. van der Broek (Eds.). Learning to read in a digital world, *Studies in Written Language and Literacy*, 17, 165 – 183.

Petrová, Z. 2008. *Vygotského škola v pedagogike*. Trnava: Typi Universitatis Tyrnaviensis.

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(Complete list of references, Annex 3)