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Skills for the literacy process

Competências iniciais para o processo de alfabetização

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Keywords

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ABSTRACT

Purpose: Examine a set of competencies in children beginning the process of literacy and find whether there is positive correlation with their level of writing. **Methods**: Study conducted with 70 six-year-old students enrolled in the first year of Elementary School in municipal schools. The children were submitted to the Initial Reading and Writing Competence Assessment Battery (BACLE) and the Diagnostic Probing Protocol for classification of their level of writing. Descriptive statistical analysis and the Spearman coefficient were used for correlation between instruments. **Results**: The students presented satisfactory performance in the tasks of the BACLE. Regarding the writing hypothesis, most children presented syllabic level with sound value. Significant positive correlation was observed between body scheme/time-space orientation and language skills. **Conclusion:** The group of schoolchildren performed satisfactorily on tests that measure pre-reading and writing skills. The areas of body scheme/time-space orientation and language presented significant correlation with the level of writing hypothesis, indicating that children with higher scores in these areas present better levels of writing. Identification of the necessary competencies for learning of reading and writing can provide teachers and educational audiology professionals with conditions for evaluation and early intervention in certain abilities for the development of reading and writing.

Descritores

Linguagem Infantil
Educação Infantil
Alfabetização
Aprendizagem
Educação Baseada em Competências

RESUMO

Objetivo: examinar competências iniciais em crianças em processo de alfabetização e se há correlação positiva com o nível de escrita que apresentam. **Método:** foram selecionados 70 estudantes, de seis anos de idade, ingressantes no 1º ano do Ensino Fundamental I de Escolas Municipais. As crianças foram submetidas à Bateria de Avaliação de Competências Iniciais para a Leitura e a Escrita (BACLE) e ao Protocolo de Diagnóstico de Sondagem para classificação do nível de escrita. Foi utilizada a análise estatística descritiva e o coeficiente de Spearman para correlação entre os instrumentos. **Resultados:** os escolares tiveram desempenho satisfatório nas tarefas da BACLE. Relativo à hipótese de escrita, a maioria das crianças apresentou o nível silábico com valor sonoro. A correlação foi positiva e significante para as habilidades de esquema corporal/orientação espaçotemporal e linguagem. **Conclusão:** o grupo de escolares teve desempenho em nível satisfatório em provas que aferem pré-competências para a leitura e escrita. As áreas de esquema corporal/orientação espaçotemporal e linguagem apresentaram significância com o nível de hipótese de escrita, indicando que as crianças com melhores pontuações nestas áreas são aquelas com melhores níveis de escrita. A identificação de competências necessárias para a aprendizagem da leitura e da escrita podem instrumentalizar o professor e profissionais da área de Fonoaudiologia Educacional quanto à avaliação e à intervenção precoce em determinadas habilidades para o desenvolvimento da leitura e escrita.

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INTRODUCTION

Brazilian education has presented significant changes in teaching in preschool, fundamental and high schools and college. The Ministry of Education, together with other institutions representing the education sector, developed the National Plan of Education (PNE)[1] that establishes guidelines, goals and strategies for the educational policy up to 2024. Among these goals, some aim at assuring the right to high-quality basic education, universalization of obligatory education and extending the educational opportunities. Within this context of changes, the onset of Fundamental School (EF) at the age of six years, determined on the National Agreement for Literacy at the Right Age (PNAIC)[2], which establishes that the literacy cycle is initiated on the 1st grade and finalized on the 3rd grade of elementary school, has challenged educators to review the concept of preschool, to assure the thorough development of intellectual, social and cognitive aspects in 6-year-old children.

According to the document "*National Curriculum Guidelines for Preschool" (DCNEI)*[3], the first stage of basic education is offered in daycare centers and preschools. These spaces outside home constitute public or private educational institutions that educate and take care of children aged zero to five years during the day, either full- or part-time, regulated and supervised by an organization of the educational system and submitted to social control. The importance of this first stage of basic education has been acknowledged, as the society has become more aware of the value of school experiences in early childhood. The preschool curriculum adopted the concept of ambiance and universal inclusive school inspired by the Program HumanizaSUS, of the Ministry of Health. The group created by the Ministry of Education and Culture (MEC) to investigate the relationship between environment and education has valued spaces that favor the interaction, listening, dialogue, and observation of needs and interests expressed by children as means to favor the literacy[4].

The preschool has undergone a clear process of review of concepts on children education in collective spaces and selection of pedagogic mediators of learning. The discussions have focused on how to guide the work for children up to three years of age in daycare centers, and how to assure practices for children aged four and five years to allow continuity of the learning process, without anticipating the contents that belong to elementary school[3].

The main objective of the pedagogical proposal of preschools is to provide conditions for the child to have access to learning and knowledge of different languages, besides assuring the right to living and interaction with other children. This concept of the relationship between ambiance, education and children is originated from the interactionist perspective, which assumes that, by social interaction, human beings not only have access to knowledge accumulated by the ancestors, but also do so as a subject. Within this context, social interactions in general, and especially those occurring in the school environment, are pointed as a way through which the learning process may be enhanced, broadening the impact of school in the child's life[5].

Concerning the previous knowledge to initiate the reading and writing, they depend on the complex integration of neuropsychological, linguistic, and intellectual processes, besides socioenvironmental and affective factors[6]. Before children learn to read and write, they must previously and consciously acquire perceptions and knowledges, such as understanding what is a graphic symbol, visual discrimination of letter shapes, auditory perception and awareness of sounds, words and sentences[7]. Identifying the requirements for learning of reading and writing achieved by each child and those that were not yet acquired or addressed provides possibilities for learning promotion.

Within this context, this study investigated the initial competencies in children in the process of literacy, and analyzed if they present positive correlation with their level of writing.

METHODS

This study was approved by the Institutional Review Board of Bauru School of Dentistry (CAAE report n. 28449514.8.0000.5417). The parents and/or caretakers agreed with participation of children in the study and signed an informed consent form, according to resolution CNS 466/12. The study design was primary, observational, cross-sectional, prospective and descriptive.

The study was conducted on 70 schoolchildren of both genders (30 boys and 40 girls), aged six years, beginning the 1st grade of elementary school I in four municipal schools selected in different regions in the city of Bauru (State of São Paulo). For data collection, consent was obtained from the Municipal Education Secretariat of Bauru. After consent, the schools were contacted and meetings with the parents or caretakers were organized to invite them to participate in the study and inform them on the study objectives.

The schoolchildren were selected according to the following inclusion criteria: being enrolled in the 1st grade of elementary school; should not present intellectual, visual, auditory or motor deficiency, as assessed on the school records; not attend school support for any reason; and previous consent from parents or caretakers to participate in the study. Data were collected between the first and second bimesters of the 1st grade of elementary school, which is a period of transition in the life of schoolchildren between preschool and formal education.

All schoolchildren had attended preschools (EMEI, EMEII), whose educational concept is based on the Historic-Cultural Theory that assumes the social nature of learning, which advocates that social interactions allow the individual to develop the upper psychological functions[8]. This was developed by the soviet psychologist Vygotsky, together with Luria and Leontiev, who advocate the continuous interaction between changeable social conditions and the biological basis of human behavior[5].

The initial abilities or competencies for literacy were assessed by the BACLE - Initial Reading and Writing Competency Assessment Battery[9]. The BACLE is an instrument that adopts neuropsychology principles and was recently validated for the Brazilian population, constituting a field procedure for diagnosis of pre-competencies for reading and writing[10]. By a set of activities, it investigates the qualitative stage of children within the pre-competencies for reading and writing. The following abilities are investigated by BACLE:

1. Perceptual maturity (PM). This involves tasks that imply abilities of discrimination and memory, both auditory and visual, of lateral dominance and verbal understanding of orders involving comparison adjectives and space positioning.
2. Body scheme and time-space orientation (BS/TSO). The abilities are assessed by three sets of tests. The two first sets comprise naming body parts in him/herself and in others, and body image on a drawing. The third investigates the time-space orientation, space-motor skill, spatial sequence and visual-spatial ability by the reproduction of figures.
3. Motor development (MD – fine motor skills). The tasks involve manual dexterity and pencil utilization.
4. Language (L). The abilities are assessed by three sets of tests: oral comprehension (instructions and story comprehension), phonological awareness (rhyme, classification, manipulation and segmentation of syllables) and oral expression (description of routine and figure, creation of sentences with previously determined words).

Overall, there are 94 activities involving the four areas. The instrument presents tables of qualitative values that relate the percentage of right answers with levels of development for the areas assessed by the instrument, as presented in Chart 1.

To assure the understanding of proposed tasks, since this instrument was designed in Portugal with instructions provided in European Portuguese, the battery was applied to 10 (ten) children aged 6 years, randomly selected and not belonging to the study group of 70 children. This revealed the need to change some words of the battery to enhance the understanding by Brazilian schoolchildren. The handout of BACLE also advises professionals to re-design the questions presented to the child in case they do not understand. Item V of test 1 – Perceptual maturity – letter b – visual, "*[...] pinta o cão de castanho*" was replaced by "*pinte o cão de marrom*"; letter c – lateral dominance of the test of II, fourth sentence, "*[...] atrás da menina que está a tocar?*" was replaced by "*atrás da menina que está tocando*?"; item III, "*[...] salta ao pé-coxinho*" was replaced by "*salte somente com um pé*" and "*[...] espreita*" by "*olhe*". In test 4 – Language, letter c – Oral expression, item I, "*[...] regista o relato*" was replaced by "*registre o relato*", and in item III the word "*regista-a*" was replaced by "*registre-a*". Finally, in item V, "*[...] registo*" was replaced by "*registro*".

After adjustments between European and Brazilian Portuguese, the BACLE was individually applied to the 70 (seventy) children in classrooms in their schools, in a session lasting approximately sixty minutes. The results were analyzed according to the tables of qualitative values (Chart 1).

The level of writing was analyzed by the Diagnostic Probing Protocol[11] which analyzes the knowledge of beginner students about writing. Probing identifies the children's hypotheses about written language, and allows the follow-up of children's advances in the acquisition of alphabetic writing. The instrument is based on studies on the psychogenesis of written language, conducted by Emília Ferreiro and Ana Teberosky. According to their studies, the child undergoes different levels of conceptual evolution while constructing their process of reading and writing. To understand the functioning of writing, children establish actual explanative "theories", as follows: pre-syllabic, syllabic, syllabic-alphabetic, and alphabetic – the so-called writing hypotheses[12].

Probing is a written activity that involves the spontaneous production (without support from other written sources) of a list of words known by the children. After writing, the students are asked to read what they wrote. By reading, the teacher observes whether the students establish relationships between what they wrote and what they read aloud, i.e. between speech and writing. To assure the effective application of dictation, the following criteria were met[11]: a) The words were part of the daily vocabulary of students. b) The list contained words with variable number of letters, including monosyllable, disyllable, trisyllable and polysyllable words. c) Dictation was initiated by the polysyllable word, then trisyllable, disyllable, and finally the monosyllable. d) Words with repetition of vowels were avoided, since they lead the children to a conflict due to the variety hypothesis. e) After dictation of the list, the students were asked to write a sentence involving at least one word from the list, to analyze whether writing of this word remained stable even within the context of a sentence.

The dictation was applied by the students' own teachers. After analysis of diagnostic maps of the 1st bimester of the 1st grade, the students' knowledge on the writing system was scored into five levels, as presented in Chart 2.

Chart 1. Value levels of qualitative analysis of BACLE

Total values	
Levels	%
1 Insufficient development	0 – 45.4
2 Lower limit development	45.5 – 55.4
3 Development in intervention stage	55.5 – 65.4
4 Development in middle level	65.5 – 75.4
5 Satisfactory development	75.5 – 85.4
6 Development of most competences	85.5 – 95.4
7 Maximum development	95.5 – 100

Source: Initial Reading and Writing Competency Assessment Battery (BACLE)[9]

Chart 2. Levels of writing of the 1st grade diagnostic map

Levels of writing	
Levels	Writing hypothesis
1	Pre-syllabic
2	Syllabic without sound value
3	Syllabic with sound value
4	Syllabic-alphabetic
5	Alphabetic

Source: *Guia para o planejamento do professor alfabetizador: orientações para o planejamento e avaliação do trabalho com o 1º ano do E.F* [11]

The results were analyzed by descriptive statistics with calculation of means, medians, standard deviation, minimum and maximum values. The correlation between instruments was assessed by the Spearman correlation coefficient. All statistical tests were applied at a significance level of 5% ($p<0.05$).

RESULTS

Table 1 presents descriptive measures, containing the mean, median, minimum, maximum, lower and upper quartile, and standard deviation of the performance of 70 schoolchildren in the BACLE tests.

Concerning the writing hypothesis of schoolchildren, their distribution in relation to the five levels were as follows: eight children (11.4%) were in level 5 (alphabetic); six (8.5%) in level 4 (syllabic-alphabetic); 36 (51.4%) in level 3 (syllabic with sound value); 10 (14.2%) schoolchildren were in level 2 (syllabic without sound value); and the same number in level 1 (pre-syllabic), as presented in Figure 1.

Table 2 exhibits the correlation between BACLE and writing hypothesis levels by the Spearman correlation test. The results evidenced positive and significant correlation between the performance in body scheme/time-space orientation and language tests, and the writing hypothesis level.

The following graphs present in detail the writing hypothesis level in relation to two areas of BACLE that presented correlation.

Figure 2 exhibits the correlation between performance of schoolchildren in the body scheme/time-space orientation test and the writing hypothesis level.

Figure 3 presents the correlation between performance of schoolchildren in the language test of BACLE and the writing hypothesis level.

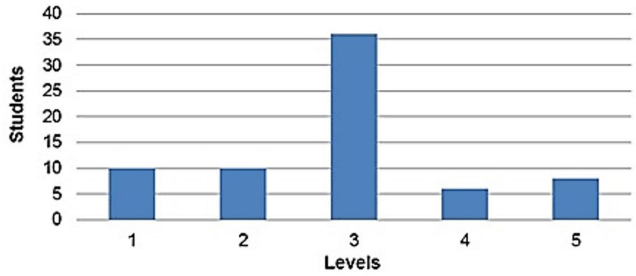

Figure 1. Distribution of schoolchildren concerning the writing hypothesis

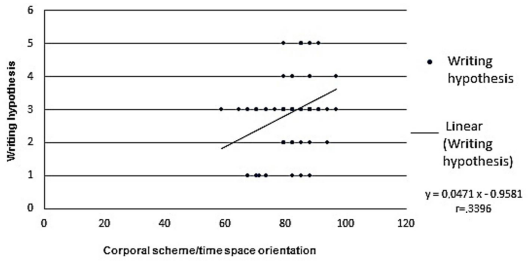

Figure 2. Dispersion graph between writing hypothesis levels and body scheme/ time-space orientation test of BACLE

Table 1. Descriptive measures of the performance of schoolchildren in the BACLE test battery

	Perceptual maturity (n=70)						
	Mean%	SD	Minimum %	Maximum %	Median %	P25 %	P75 %
Auditory	78.44	±09.59	55.50	100.00	77.70	72.20	83.30
Visual	88.13	±08.83	62.50	100.00	87.50	81.20	93.70
Lateral dominance	84.11	±10.40	60.00	100.00	83.30	76.60	93.30
Acknowledgement of lateral dominance	46.64	±24.51	08.30	100.00	45.80	25.00	58.30
Overall performance	76.95	±08.62	46.57	100.00	75.57	63.75	82.15
Body scheme and time-space orientation							
Identification in him/herself	85.36	±14.43	50.00	100.00	75.00	75.00	100.00
Identification in others	75.26	±12.48	37.50	100.00	75.00	68.70	87.50
Position in graphic space	89.57	±11.35	50.00	100.00	90.00	90.00	100.00
Overall performance	81.65	±08.10	45.83	100.00	80.00	77.90	95.33
Motor development							
Fine motor skill	84.97	±10.06	64.20	100.00	85.70	78.50	92.80
Language							
Oral comprehension	76.64	±15.13	30.00	100.00	75.00	65.00	90.00
Phonological awareness	75.17	±18.00	23.00	96.10	76.90	69.20	88.40
Oral expression	85.82	±14.90	05.50	100.00	88.80	77.70	94.40
Overall performance	78.50	±13.33	19.50	98.70	80.23	70.63	90.93

Table 2. Correlations between writing hypothesis and BACLE areas

Schoolchildren (N=70)	PM	BS/TSO	MD	L	OP
Writing hypothesis	0.2174	0.3396	0.295	0.4556	0.4142
	p=0.071	p=0.004	p=0.809	*p=0.000*	*p=0.000*

Captions: PM = perceptual maturity; BS/STO = body scheme and time-space orientation; MD = motor development; L = language; OP = overall performance ($p < 0.05000$)

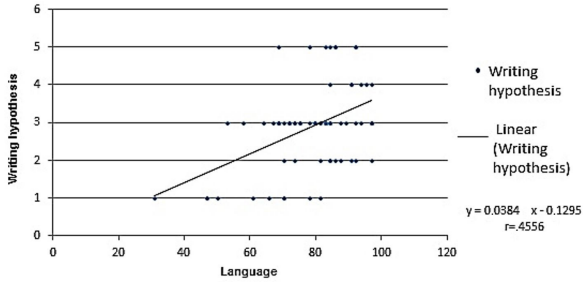

Figure 3. Dispersion graph between writing hypothesis levels and language test of BACLE

DISCUSSION

Written language is a means of linguistic mediation, whose processing involves high complexity supported by the structural and functional organization of the central nervous system. The most important functional systems involved in this processing are sensory, motor, language, memory and attention[13]. In this sense, every child in the literacy process should develop these systems, which though supported by innate mechanisms, are constructed from experiences mediated by the adult.

Promoting and assessing important abilities for learning of reading and writing may provide an instrument for both child education teachers and speech-language pathologists in their work with children with or without learning difficulties. Within this context, the more the professionals may follow the evolution of child development in the field of learning of school contents, the faster they may identify risk factors for learning disorders. BACLE is an evaluation instrument that investigates competencies related with the learning of reading and writing[2,3,7]. Despite some limitations, the BACLE has contributed to acknowledge which competencies are fully developed and which should be constructed in study for children with risk of learning disorders[14,15]. The achievement of this qualitative profile of abilities is compatible with the DCNEI[3], which indicate the importance to establish procedures to evaluate the child development.

One of the abilities investigated in the group of schoolchildren was the perceptual maturity (PM), a cognitive capacity function that is developed with age and experiences (the greater the experience, the greater the learning), allowing the individual to verbalize, manage symbols and abstractions, make judgments, discriminate thoughts and motivations, in the way of thinking and acting[9]. The mean performance achieved by schoolchildren was 76.95% (Table 1), which corresponds to level 5 of BACLE (Chart 1), indicating a satisfactory stage of development. The activities required in the field of perceptual maturity of BACLE are part of the pedagogical practices of child education in institutions whose work is based on the historic-cultural theory, such as the schools included in this study. By interactions and plays, these activities aim to promote the knowledge of oneself and of the world, by broadening the sensory, expressive and bodily experiences, as proposed by the DCNEI[3].

In the three sets of tests that investigated the area of body scheme / time-space orientation (BS/TSO), the means of percentages achieved in each subset (Table 1) indicated that children satisfactorily developed the ability to accurately judge the relationship between body and environment on themselves, on the other and graphic space. It should be highlighted that some school difficulties are related with the lack of psychomotor exercises, especially those related with body image[16,17]; thus, activities with body movements should be part of the child's universe, since the unstable psychomotricity is reflected in abilities that are fundamental for learning[17].

The competency motor development (MD) assessed by BACLE specifically analyses the fine motor skills. The mean achieved by the group of 70 children was 84.97% (Table 1), indicating performance between levels 5 and 6 of BACLE, i.e. with domain of most abilities. After these levels, children reveal that they acquired competencies in the ability to perform diverse actions, which constitute pattern of movement and precision, control and dexterity[9].

The importance of motor act for the graphic act is unquestionable. The participation in motor activities is an effective means to reinforce the abilities of thinking and learning of academic concepts. The acquisition of manual writing requires the combination of coordination of visual-motor abilities with motor and cognitive planning and perceptual abilities, being an important variable in the performance of writing[18]. Motor difficulties are associated with learning disorders[19], and psychomotricity lessons by Physical Education were shown to positively influence the fine motor skills, balance, body scheme and spatial organization[20]. The curriculum attended by the schoolchildren evaluated in this study includes three 55-minute classes of Physical Education per week, aiming to experience body practices and remind the motor experiences lived outside school, which may have favored their good performance in the tests of fine motor skills assessed by the instrument.

The performance of the group of schoolchildren in the field of Language (L) was satisfactory (level 5, according to the classification of BACLE) in all modalities, oral comprehension, phonological awareness and oral expression (mean performance of 76.6%, 75.17% and 85.82%, respectively). The National Curriculum Guidelines for Preschool define the promotion of child development regarding the linguistic aspect as one of the central points. They highlight the transitional nature of this stage of school education, which should progressively articulate communicative and ludic activities with a school environment characteristic of fundamental education. The work of oral modality is a necessary basis for the development of other communicative modalities, such as writing. Thus, promoting the oral language aids the development of discursive types that will support the school learning of Portuguese and other fields. It also allows the child, a historic subject with rights, to experience daily practices that aid the construction of their personal and collective identity, and senses on nature and society, to produce culture.

The correlation between competencies assessed by BACLE and the writing hypothesis level was analyzed in this study to check the direction of relationship between these two variables, even though it is known that correlation does not necessarily imply causality. The field of body scheme / time-space orientation presented significance (Table 2, Figure 2), i.e. the better the performance in this field, the better the level of writing in this group of schoolchildren.

One hypothesis to support this correlation is the fact that this area assessed abilities of perceptual-motor integration by tasks of symmetry, copy of figures, drawing of body image, reproduction of sequence of figures, and others, which stimulate the relationship of inseparable structural internal factors of thinking and language in the longitudinal construction of knowledge. Visual perception is a cognitive function in which information on the visual environment are made available in our conscience and/or are presented to guide our actions. This perception favors the construction of experience and conscience of the visual word by the attention, guiding the motor actions. Specifically, during letter perception, we must process and use visual information specifying the relative sizes, locations, orientations and angles of lines in the stimuli, because these features define letter identity[21]. Schoolchildren who do not develop visual-motor integrative ability may present writing difficulties, especially in the quality of writing, impairing the school progress and favoring the appearance of learning disorders[22]. Thus, we understand that the good development of writing depends on this integration.

The language field of BACLE also presented significance with the writing hypothesis level (Table 2, Figure 3), since the better the language level, the better the level of writing observed in schoolchildren. The oral language and writing are closely related, though with different structure and functioning. In the writing process, the child must abstract concrete symbols into graphic symbols. Writing is the abstraction of this concrete, and this process is facilitated in the context of relationship with the other, since writing only has meaning in a certain context[23].

Specifically concerning the phonological awareness, the ability to isolate, in speech, the units that are words and sentences is part of the knowledge that children should acquire, previously and consciously, to be able to read and write[24]. The good development of reading and writing abilities depends on the extrinsic and intrinsic conditions deposited on the child. Among these, the child exposure to activities that explore the conscious manipulation of sounds favors the written language[25]. There is a reciprocal relationship between the development of metalinguistic abilities and reading and writing, in which one enhances the development of the other. Brief trainings of phonological awareness in the classroom presents positive effect on the learning of reading and writing. Additionally, working on this field is an important treatment strategy for children with learning difficulties and language processing disorders[26].

The activities of phonological awareness contribute to enhance the child performance during the initial stage of learning to read[27]. A study[28] that investigated the relationship between pedagogic practice in child education and the development of phonological awareness revealed that the group of schoolchildren who received longer periods of instruction in activities related with oral language exhibited the greater development of phonological awareness.

The result of the present study demonstrated that the schoolchildren presented well-developed competencies to initiate the learning of reading and writing, suggesting that the previous experiences acquired in preschool in the schools analyzed have allowed the construction of sensory, linguistic and motor knowledge. The attendance of preschool positively influences the performance of students in elementary school, regardless of the social background[29]. Evidences relating the children's experiences in preschool with long-term outcomes in child development demonstrate benefits for social, cognitive and educational development, even in adulthood, with consequences for the individual and also for the society[30].

As mentioned in the introduction of this study, the preschool has experienced an intensive process of review of concepts on children education in collective spaces, selection of pedagogic mediators of learning and their development. Thus, in this transition between traditional proposals and those not yet put into practice, there may be a combination between them. In municipal schools included in this study, we observe that the pedagogic proposal adopted both in preschool and early grades of elementary school emphasizes the social environment in the construction of knowledge. However, the assessment of learning to write is systematized by the analysis of a universal sequence of stages by probing of writing, based on Ferreiro and Teberosky[12]. Even though the present authors consider the interactionist proposal, alike the socio-historical pedagogy adopted by the schools analyzed, there is an imbalance between the strategy to evaluate the learning of writing and the means to conceive the relationship between development and learning. This does not reduce the relevance of reviews conducted by the schools based on the DCNEI; rather, it demonstrates that this process of change still requires discussions on how to guide the teacher's work to assure the continuity between preschool and elementary school in the learning process.

Finally, even though the inclusion of six-year-old children in elementary school was an important milestone, it should be considered that, while initiating elementary school at a younger age, the moment of childhood should be assured. The school should re-think its entire structure, both physical and pedagogic. Both teacher, parents and other professionals should be involved to create the necessary conditions for the child to achieve cognitive, emotional and physical development.

CONCLUSION

The group of schoolchildren beginning the literary process presented satisfactory performance in tests that assess the pre-competencies for reading and writing, suggesting that the schools are developing activities that meet the national curricular guidelines for child education. The areas of body scheme / time-space orientation and language presented significance with the writing hypothesis level, indicating that children with better scores in these areas present better levels of writing. Confirmation of this correlation provides a basis for teachers to evaluate and prepare activities, creating situations in which the child may develop and experience such abilities even before formal education.

The identification of necessary competencies for learning of reading and writing may provide conditions for teachers and Educational Speech and language pathologist professionals for evaluation and early intervention in certain abilities, for the development of reading and writing.

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Author contributions

KCPC was responsible for data collection and analysis, writing of the article; MAPMM was responsible for writing of the article on social and educational aspects; SRVH was responsible for study design, writing of the scientific article.