

Early Writing Skill Intervention for Elementary Students with Learning Disability: A Systematic Review

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Abstract— Writing is a tool for communication that used to convey ideas in the form of words and is essential skill that everybody need. The ability to write is needed for success in academic, workplace setting and daily living. Writing is so challenging for students with learning disability. Writing difficulties that are not detected until middle school will influence their academic performance. Intervention to overcome writing difficulties should be given as soon as possible. It is important for teacher to choose intervention that suitable for the needs of each student. The purpose of this study was to examine the writing strategies used to help students with learning disability. This study was designed using a systematic review method. The 8 study reviewed contain various interventions, such as: self-regulated strategy development (SRSD) instruction, co-teaching program, sentence-combining intervention, problem solving approach and multi-component intervention.

Keywords— *early writing, intervention, learning disability.*

I. INTRODUCTION

Along with the times and fast technology, handwriting still had an important role in everyday life. Writing is one of the communication tools used to convey ideas in writing. Writing skill is needed in many areas of life. For students handwriting is an easy and convenient way to do most of the school work. In the workplace, writing required in doing office work, such as writing reports, resume, memos, etc. In everyday life, writing is used to communicate with others through e-mail, SMS, commenting and posting on social media. Low writing skill will affect the student's performance on the higher education and when entering the workplace [1], [2], [3]. Early writing is a learning stage for low grade elementary school students. Early writing skills can affect the development of higher writing skills [4]. Early writing is given as a basis for further writing skills. Early writing difficulties can affect other learning activities. Without these skills, students may have to work hard in doing writing assignments.

This condition can cause low academic achievement and lack of confidence in writing task even avoid writing assignments and develop their mindset of not being able to write [4]. Students in lower classes are expected to have good handwriting skill, but there were found the students who have learning difficulties, especially in early writing. Students with learning difficulties have difficulties in

academic areas such as reading, writing, spelling and arithmetic. According to the DSM-5 Cortiella & Horowitz [5], learning disability is consistent difficulties in reading, writing, or arithmetic that occurs at school age. Symptoms can indicate difficulty in reading, poor writing skills, difficulty remembering mathematical facts and mathematical reasoning skills. Students with learning disabilities exhibit low academic achievement in comparison with their classmates. In general, learning difficulties are found in the early grades of elementary school. The prevalence of school-age children who experience learning difficulties is in the range of 1% to 30% [6]. Early writing difficulties in elementary schools are estimated in the range of 12% to 44% [4]. Recent studies estimate between 6.9% to 14.7% found students experiencing specific learning difficulties in writing, with and without reading difficulties [7].

Writing is a challenging activity for students with learning disability because writing is a complex developmental task which combines fine motor skills, visual-motor coordination, cognitive, alphabetical knowledge such as letter names, shapes, and sequences and phonological awareness including rhyming, blending, and segmentation ([8], [9], [1], [3]). Students with learning disability often show a low quality of writing, such as errors in spelling, handwriting, and sentence structure. In addition, students with learning disability have a weak memory capabilities compared to their peers.

The importance of writing skills encourages various studies on writing interventions, especially for students with learning disability. Graham, *et al.*, [10], identify effective writing learning for elementary students. The findings of these studies indicate that learning strategies and knowledge had an important role in the development of writing for elementary school students. Giliespie and Graham in [11] conducted a meta-analysis of 43 studies on the impact of interventions on the quality of writing from students with learning disabilities in grade 1-12. The results showed that four interventions writing, such as strategies, goal setting, dictation, and the writing process proved to have a positive impact and significant influence on the writing quality of LD students. Kaldenberg *et al.*, in [1], conducted a meta-analyst to 23 single-subject study on writing interventions of student with learning disability in grade 4-12. The writing interventions used in this study included Self-Regulated Strategy Development (SRSD), systematic instruction,

assistive technology, and direct instruction. The results show that intervention using SRSD or non SRSD has a high effect on improving writing skill.

Writing difficulties for students need effective interventions to help them overcome these obstacles. There have been many studies on writing intervention for both regular students and students with learning disabilities. However, in this study will focus on research conducted an intervention of early writing for students with learning difficulties in the low grade. This study aims to discuss the early writing intervention that given to students with learning difficulties in low grade elementary school. Then, research questions can be formulated, such as:

How is the early writing intervention of students with learning difficulties in low grade elementary school?

The rest of this paper is organized as follow: Section II describes the proposed literature review. Section III describes the proposed research method. Section IV presents the obtained results and following by discussion. Finally Section V concludes this work.

II. LITERATURE REVIEW

Learning difficulties are a common condition experienced by some students in elementary school, which found that students have a gap between ability and academic achievement. Although learning difficulties occur at a young age, the difficulties are usually not known until the child reaches school age. Students with learning difficulties have difficulty especially in early writing and legibility [12]. Early writing skills usually develop in children from grades one to five (ages 6-11 years). This ability will develop rapidly during first grade (age 6-7 years) and reach its peak in second grade (age 7-8 years) as indicated by the writing being more organized [13]. Students who experience early writing difficulties will usually have difficulty following the burden of writing work required during the elementary school years. Failure experienced by students during school years will have a negative effect, namely, inhibiting academic progress, decreasing self-esteem, and showing problematic behavior.

Students with learning difficulties show different characteristics from other students. Characteristics of students with specific learning difficulties especially in the aspect of writing are shown in: (a) difficulty holding stationery, (b) slowness in writing and often avoid writing assignments, (c) difficulty writing or drawing according to lines or in paper boundaries, (d) errors using punctuation, (e) making misspellings, (f) there are inconsistencies in font size, letter shape, and spacing, (g) difficulty expressing thoughts in writing, and (h) difficulties in word and sentence structure [5]. They also have difficulty understanding basic reading skills, such as phonemic awareness (the ability to distinguish sound letters in words) and decoding [5]; [9]; [14], [3]. Their writing results usually use limited language and vocabulary because they use words that they know how to spell it. Writing outcomes of students with learning disability get lower scores than their peers on aspects of quality writing, organization, vocabulary, fluency, spelling, grammar, early writing and motivation [3].

Writing is an activity that requires good cognitive and motor skills. The components that underlie the initial writing skills are fine motor ability, visual-motor coordination, and perception [13]. Poor motor development causes students to have trouble in holding pen, affecting the ability to write the shape, size and placement of letters so that students have poor writing. Students who have poor motor-visual coordination causing students to have difficulty doing the task of copying so that the writing becomes chaotic and make them slow in carrying out tasks. Perceptual difficulties may be experienced is visual perception and auditory perception. If visual perception is disrupted, students may find it difficult to distinguish nearly the same letter as /d/, /b/, /p/, /q/, /h/, /n/, and so on. If the auditory perception is disrupted, students will experience difficulty in writing the letters or words they hear. Students who experience memory impairments can cause students to be unable to remember what they will write.

Writing difficulties that are not detected until secondary school will be increasingly difficult to overcome these obstacles. The intervention to overcome writing difficulties should be given during low grade elementary school to ensure students master initial writing skills [15]. The initial writing intervention aims to educate students be able to write well. If students have good writing skills, it is expected that their writing will be of high quality. Effective early intervention will have a positive impact on teachers and students. Interventions are planned teaching procedures [16]. Writing intervention is taught through activities that are meaningful and motivate students [8]. There are differences in learning outcomes between students with learning difficulties with their peers so that students with learning difficulties need learning interventions that are appropriate to their needs, namely specific and structured instruction.

Early writing intervention that used is Self-Regulated Strategy Development (SRSD). The SRSD is a complex multi-component instructional based on what the student had learn [17]. The SRSD interventions have a positive impact in improving writing performance on a variety of settings, grade levels and gender. In the intervention with SRSD the teacher guides students to understand the writing process, which includes planning, compiling, editing, and revising. The SRSD interventions provide freedom for students and teachers in conducting learning activities according to the needs and speed of student learning. The SRSD improves five main aspects of student performance, such as: (a) writing genre, (b) writing quality, (c) knowledge for writing, (d) approach to writing, and (e) motivation [17].

III. RESEARCH METHODS

This research is a systematic review literature conducted by searching research journals (articles that present methods, results and discussion clearly) in the early writing interventions for students with learning difficulties to add related literature reviews. The research criteria used in this review are:

- The participants used involves at least one student with learning difficulties or students at risk of learning difficulties in grades one through four

- The study involve the intervention of early writing
- The study published between 2007 and 2018.

Research is excluded if:

- The class of participants is outside the low grade of elementary school
- The study did not report demographic info which included the number of students with learning difficulties and non learning difficulties

This article focuses on summarizing intervention strategies and describing the characteristics of students with learning difficulties. In this article, the term intervention is a strategy or method used in learning to accommodate the difficulty of early writing. Search for journals using online databases proquest and gale using keyword early writing intervention, early writing instruction, handwriting

intervention, writing skills, learning disability, learning difficulties and elementary school. Each journal is analyzed with coding into seven indicators: (1) type of intervention, (2) the class, (3) participants, (4) a target capability, (5) intervention procedures, (6) duration of the intervention, and (7) results of the intervention.

IV. RESULT AND DISCUSSION

The study of early writing interventions for students with learning disabilities in low grade elementary schools published in 2007-2018 found eight studies presented in Table I.

TABLE I. STUDY OF EARLY WRITING INTERVENTION FOR STUDENT WITH LD: 2007-2018

Author	Intervention	Participant	Target Capability	Intervention procedure	Research design	Results
Saddler & Asaro [18]	SRSD (POW + WWW)	6 students with LD in grade 2	Quality of story writing	Intervention is carried out 3 times a week for 11-12 meetings (30 minutes)	Multiple baseline across subject	The quality of written stories increases
Saddler, <i>et al.</i> [19]	Sentence-Combining Intervention	3 students with LD, 3 students who have weak writing skills in grade 4	Ability to compose sentences	Intervention is carried out 3 times a week for 18 meetings (25 minutes)	Single subject design	The ability to construct sentences increases and the quality of stories increases
Case-Smith, <i>et al.</i> [20]	Co-teaching Handwriting Program	36 students at risk of LD in grade 1	Legibility, speed of writing, simple sentence construction and spelling	Interventions are conducted 2 times a week (45 minutes) for 12 weeks (24 meetings)	One group pretest-posttest design	Students show progress in legibility, speed, fluency, and grammar
Dunn [21]	ART (Ask, Reflect, Text)	3 students with LD in grades 2 and 4 (dysgraphia)	Quality and content writing	The intervention was carried out for 25 meetings (45 minutes).	multiple baseline across participants design	Students show great progress on the composition and content of the story, the quality of the story has a slight improvement
Datchuk [9]	Problem Solving Approach (visual cues and memory retrieval)	1 student with LD in grade 4	Font shape, alphabet knowledge, and writing speed	The intervention was carried out for 15 minutes	case study	Students show progress in the accuracy of shape letters, alphabetical order, faster and focus on completing writing assignments
Harris, <i>et al.</i> [17]	SRSD Instruction (POW + TREE)	1 student with LD in 4 grade	Write an opinion essay	Interventions are conducted 12-15 meetings for 4-8 weeks (30-45 minutes)	Case study	Students show progress in writing

						essays
Datchuk and Dembek [15]	Sentence Intervention	2 students with LD, 3 students at risk of LD in grade 3 & 4	Sentence arrangement	Interventions are carried out 3 times a week (30 minutes) for 15 meetings	multiple baseline across small groups	Students show progress on the ability to compose simple sentences
Grunke, <i>et al.</i> [22]	Multi-component Motivational Intervention (explicit timing, immediate feedback, positive reinforcement)	11 students with LD (ages 10-11 years) in grade 4	Writing performance (number of words in narrative text)	five daily sessions in each phase	ABAB design	Students show increased performance in writing simple narrative texts

The results of the review will be explained based on the intervention category.

Self-Regulated Strategy Development (SRSD) Two studies focus on use SRSD to improve writing quality. Research using SRSD will be explained in sub categories include POW + WWW, TWA + PLAN, POW + TREE.

- POW (Pick My Idea, Organize My Note, Write and Say More) + WWW (What = 2, How = 2)

Saddler & Asaro [18] conducted SRSD interventions with the mnemonic strategies POW and WWW to improve story quality of students with learning difficulties in the second grade. POW used to assist students in planning and writing story. After applying POW, added the mnemonic strategy WWW to help students compile stories based on 7 fundamental questions from the story component (Who is in the story ?, Where does it take place ?, When does it take place?), W = 2 (What happens ?, What happens next?, And H = 2 (How does the story end ?, How do the characters feel?). Implementation of the intervention began with introduction of the mnemonic strategies POW and WWW. After students understand the concept of the strategy, the teacher reads the story and asks students to identify the components of the story based on WWW strategies. The remaining time is used to practice writing stories based on POW strategies. Application of this intervention teachers also do verbal prompting and modeling in writing and revising the story of each student. Interventions are carried out 3 times a week for 11-12 meetings (30 minutes). The quality improvement of stories is measured based on the number of story elements that appear, such as: the main character, place, time, what the main character wants to do, what the main character does, what they feel, how the story ends. The results of the intervention showed that the stories written by students were longer and contained seven components of the story.

- POW (Pick My Idea, Organize My Note, Write and Say More) + TREE (Topic sentence, Reason, Explain reason, Ending)

Harris, *et al.* in [17], Conducted case studies SRSD intervention to improve narrative writing in the fourth grade of student with learning disability. The SRSD interventions are applied using mnemonic strategies POW and TREE. The purpose of the mnemonic strategy POW is to remind students of the genre to be written and what will be written, because in this strategy students make small notes as reminders. The mnemonic strategy TREE helps students understand that an essay should contain important elements such as clear sentences, clear reasons, and a good ending. In addition, students also understand what they write must be reasonable and able to convince the reader. The results of the intervention showed an improvement in the quality of essays written by students. This also influences students' behavior towards writing; students become more confident and increase the motivation to write.

a) Sentence-Combining Intervention

Two studies used sentence-combining interventions. Datchuk and Dembek in [15] conducted a study to find out the effect of sentence intervention to spelling and early writing. The intervention uses copy-cover-compare model adaptation. The intervention was carried out in 15 learning times. The first three lessons are sentence instructions that last for 30 minutes. In addition, the teacher also uses a systematic and explicit instruction strategy by providing examples of simple sentences and complex sentences, guiding students through practice by providing immediate error correction when students make mistakes and give praise for the right work. For learning four to fifteen filled with copy-cover-compare spelling activities, modeling of complete simple sentences, two timed trials of simple sentence construction, feedback, error correction, and encouragement in each learning session. This session learning is designed to improve the accuracy of simple and complex spelling and sentence construction. The results of

this study indicate the progress of students in composing simple sentences.

Saddler, *et al.* in [18] do sentence-combining intervention aim to improve complex sentences construction of students with LD and students at risk. Interventions are given three times a week for six weeks (18 lessons) with duration of 25 minutes. Interventions in sessions 1-3 adapt from Saddler and Graham (2005). The instructions are divided into three instructional units consisting of six units learning. Each unit teaches a certain sentence construction. The first unit combines sentences using adjectives (Kernel Sentence Cluster). The second unit combines sentences by entering phrases, in the third unit students use 'but' and 'because' connectors to combine Kernel sentences. The fourth learning is designed for story planning such as arranging sentences into short paragraphs and providing additional training with the ability to combine sentences. The fifth learning is monitoring student progress by giving a test combining sentences with 20 minutes. Sixth learning, each student writes a story from a given picture. The results of this intervention show the ability of students to construct sentences into a story.

b) Co-teaching Handwriting Program

This intervention is carried out by collaboration between the teacher and the occupational therapist. Interventions are conducted 2 times a week (45 minutes) for 12 weeks (24 meetings). Case-smith, *et al.*, [20] conducted an experimental study to compare the effects of co-teaching handwriting programs on two group students, namely high-performance student and low performance student. This intervention implements two types of co-teaching, station teaching and team teaching. At station teaching, the teacher and co-teacher create learning activities which are divided into several stations. Students are divided into small groups, such high performing student and low performing student. The group takes turns participating in learning at a different station. At team teaching, teachers and therapists alternately provide intervention. They coordinate interventions based on expertise and content. Every week the results of student writing are reviewed as a basis for determining the activities or strategies for subsequent learning. In this intervention, the teacher and therapist also provide individual accommodation in the form of highlighted paper, pencil grips, three tone paper, raised-lined paper, and slant boards. The first session of intervention focused on writing letters. The teacher and therapist model letters formation and consistently provide verbal and visual cue during the intervention session. The students rotate in small groups to the next station which provides training on motor, sensory, visual and motor coordination, and correct letter formation memory. Most activities are carried out using multisensory strategies. In the second session, the therapist examines the letters that have been taught in the first session, students copy the sentence as a sample of writing. In the final period of the 2nd session, the teacher gave a "writing workshop" that gave a short lesson about the concept of writing, then students were given the freedom to write stories in 20-30 minutes. At the end of the session, students read the stories of their friend. Intervention showed an increase in legibility,

speed and fluency of writing in students with diverse learning needs.

c) ART (Ask, Reflect, Text)

Dunn in [21] combines mnemonic ART strategies with art media to improve the writing skills, students with writing difficulty in grades 2 and 4. Mnemonic ART interventions had component that adapts from the SRSD strategy namely WWW (Who is in the story?, Where does it take place?, When does it take place?), W = 2 (What happens?, What happens next?), And H = 2 (How does the story end?, How do the characters feel?). Intervention includes three steps: (1) student asked themselves about the 7 questions (WWW, W = 2 and H = 2) to determine the topic of the story, (2) students reflect on their answers and illustrate their ideas with art media (paint, colored pencils, play dough), (3) students use their creation to write sentences in the story. In the baseline phase, students practice writing procedure texts (e.g. recipes, instructions) before practicing writing stories. ART interventions are given according to the writing skills of students in the baseline phase (students X 13 sessions, students Y 8 sessions, and students Z 4 sessions). The intervention was conducted for 25 meetings (45 minutes) which were divided into 2 sessions. The first session students practiced reading stories, spelling, making sentences based on pictures, and combining simple sentences with conjunctions and / but which were carried out for 20 minutes. The second session was the implementation of the mnemonic ART strategy for 25 minutes. The results of the intervention indicate that this strategy can help students have difficulty learning to improve composition and content in writing stories. After attending two training sessions with the mnemonic ART strategy, the students' writing shows the relationship between ART and the content and quality of the story. All students showed rapid changes in story content, while in the story quality only two students showed change.

d) Problem Solving Approach

The problem-solving approach is adapted from the approach to applied behavior analysis. This approach has four stages including: (1) problem identification, (2) problem analysis, (3) solution determination, (4) implementation and evaluation. Problem identification aims to find areas of student difficulty, can be done by informal observation when students write and collect samples of student work. Problem analysis is done to dig deeper into the area of difficulty as an effort to determine the best solution. Conducted a case study of problem solving approach by teacher in four grades for student with learning disabilities. The teacher conducts an informal assessment to identify difficulties experienced by students by analyzing the results of writing and assignment. Students have difficulty in the form of letters, font sizes, spaces, alphabetical order, and writing speed. To overcome this problem, the teacher decided to use instructional framework with visual cues and memory retrieval models. Visual cues and memory retrieval are used to intervene in letter shape, size, and space errors. Orthographic activities are used to

intervene alphabetically. The teacher also adds training to increase writing speed. This intervention was carried out as a warm up activity in each language subject for 15 minutes. With this intervention can increase accuracy in letter formations and alphabetical order. Students are also able to complete other exercises faster and more focus.

e) *Multi Components Intervention*

Grunke, *et al.*, [22], conducted experiment to assess the effectiveness of specific motivational intervention including explicit timing, immediate feedback through self-scoring, and positive reinforcement through verbal praise in writing performance of students with learning difficulties and students at risk of learning difficulties. In the baseline phase, students are asked to write stories without time limits place them in their folders and give the folder to the teacher whenever they think they are ready. At the beginning of the treatment phase, the teacher encourages students to write stories that are better and longer than the previous story, for that the teacher prepares a graph for each student that describes the number of words written the previous day. Students are given 10 minutes to write stories. Then, students are asked to count the number of words written and enter the graph. Between each session, the teacher praised students for their efforts and especially for each increase in the total number of words written. With this intervention students can increase the number of words written in the story.

Based on several early writing intervention studies can be seen that SRSD interventions and Sentence-Combining Intervention are frequently used interventions. The SRSD intervention in Saddler & Asaro's in [18] study was applied to second grade students, while Haris, *et al.*, in [17], applied SRSD to fourth grade students. The results of both studies indicate that SRSD interventions can improve the ability to write stories and the quality of students' stories increase. This is in accordance with the opinion of Alharbi, *et al.*, in [23] which states that SRSD interventions can have a positive impact in improving writing performance on various settings, grade levels, and gender. The sentence combining intervention is used at the sentence writing level. The study conducted by Datchuk, *et al.*, in [15] and Saddler, *et al.*, in [19] applied sentence-combining interventions to students with learning difficulties and students at risk in grades 3 and 4. Sentence-combining interventions are interventions to address difficulties in developing sentences and story. Sentence combining includes re-writing activities and revising the writing to be more effective and interesting. The results showed that the sentence combining intervention was able to improve the ability to construct simple and complex sentences so that students' writing quality also increased.

V. CONCLUSIONS

The importance of writing skills requires students to have good writing skills. This makes students with learning difficulties to be in disadvantage position. To overcome these difficulties, writing intervention must be given immediately. Early writing interventions that can be

provided for students with learning difficulties include: SRSD, Sentence-Combining Intervention, Co-teaching Intervention, Problem Solving Approach, and Multi-component Motivational Intervention. Each intervention has been proven to have a positive impact on students' initial writing skills, such as literacy, accuracy of letters shape, alphabetical order, increasing writing speed and focusing more on completing writing assignments. In addition, at a higher-level student are able to construct simple sentences and complex sentences, showing an increase in the writing of stories and essays that can be seen from the composition and content of stories or more complete and meaningful essays.

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