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MyPlate Food Model and Family Grocery Shopping with Second and Third Graders are Significant Interventions for the Development of Interactive Health Literacy Skills

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Abstract

A school-based nutrition education intervention was implemented with second and third graders who used their functional health literacy skills of reading, writing, and speaking to learn about the MyPlate food model from the United States Department of Agriculture. The pretest-posttest intervention determined if children had ever seen the MyPlate food picture and if children participated in grocery shopping and meal making events with their family at home. Interactive health literacy accounted for the conversations that children had with their teachers about food and nutrition when learning about the MyPlate food model and when preparing three recipes over three days in the school classroom. Interactive health literacy strategies also included children's ability to interact and learn about the MyPlate food model as a valid and reliable print and electronic material associated with meal planning. Implications and guidelines for teachers and parents are discussed for advancing the need for and understanding of functional and interactive health literacy for elementary children in the United States.

Keywords:

Myplate Food Model, Functional Health Literacy, Interactive Health Literacy, Family Grocery Shopping, Meal Making

Introduction

Health literacy is considered a cognitive and functional term (Baek et al, 2019), and a skill that can be practiced in preK-12 school health education in a developmentally appropriate way (National Consensus for School Health Education, 2022). Historically, the concept of health literacy has included a focus on the functional literacy skills of reading and writing as ways to determine improved health status (Morrison et al., 2019) with more recent interests in health literacy as a social practice (Samerski, 2019; Pitt et al., 2019). Health literacy is also known to have a social gradient that ties the concept of health literacy to the social determinants of health (Tamayo-Fonseca et al., 2023; Felter & Ubbes, 2023). In global contexts, one of the social

determinants of health is education. Lastrucci and colleagues (2019) found that functional health literacy mediated 19% of the association between education and self-reported health, and functional health literacy mediated 13% of the relationship between financial status and self-reported health. Interactive health literacy was not addressed.

Across all academic disciplines, reading and writing are related to thinking (Pearson & Tierney, 1984; Staton-Spicer & Wulff, 1984). Writing is the action of expressing ideas, opinions, and views in printed or written communication (Gerde et al., 2012). Reading is useful in accumulating curriculum knowledge in the form of facts, topics, and skills (Ubbes, 2002) through receptive language (Webb, 2013, p. 346), whereas writing is useful in "putting knowledge and personal ideas to work" (Wang & Wang, 2012, p. 40) through expressive language (Brannon & Dauksas, 2014). For example, the writing of grocery lists and recipes is an expressive language that can help with memory recall and reading comprehension about food and nutrition. Children build background knowledge in a health-related topic like nutrition (i.e., domain knowledge) as they read and develop an ability to make inferences when decoding the meaning of words, symbols, and gestures from print and electronic materials. When thinking and learning alone and especially when thinking and talking with others, children learn to put their own thoughts into words, symbols, and gestures during an encoding process which is foundational to functional literacy. When functional literacy skills and processes are practiced by children while also learning about health information, functional health literacy emerges (Ubbes, 2023). When the health information is verified through an interactive process with significant others while using valid and reliable materials, interactive health literacy will also develop (National Consensus for School Health Education, 2022).

Health literacy activities for nutrition include reading recipes, reading food labels, writing and talking about grocery lists, reading and talking during grocery shopping, talking and reading recipes during meal making, and talking and eating meals in social interactions. Such nutrition-related activities are examples of functional health literacy because people are reading, writing, and speaking about health (Ubbes et al., 2023). As such, nutrition-related activities like those named above could also be called health literacy events (Rumenapp et al, 2023). Health literacy events are opportunities when individuals transform their health-related knowledge into practice (Rumenapp et al., 2023). Health literacy events give individuals opportunities to demonstrate their functional health literacy skills which serve as developmental precursors to health habits and routines (Ubbes, 2023). Health literacy events can also help people to develop their interactive health literacy skills when participating in food-related conversations in social settings. Interactive health literacy increases when the context requires people to use literacy skills to access and act on print and electronic information when making decisions about health (Pitt et al., 2019).

In school health education, elementary children have the potential to build their interactive health literacy skills by learning about the MyPlate food model based on the 2020-2025 Dietary Guidelines for Americans (United States Department of Agriculture, 2020). When students interact with valid and reliable health information from a governmental agency to demonstrate their health literacy skills, they will also learn nutrition guidelines and practice the skills of decision making and goal setting for improved nutrition. Support from parents and teachers is necessary so children can scaffold their growing understanding of the MyPlate food model. When students demonstrate the ability to access valid information, products, and services to enhance health, they meet a health education curriculum standard called health literacy (National Consensus for School Health Education, 2022). Students who practice the MyPlate application in school health education class (https://www.choosemyplate.gov/node/5760) can also advocate for nutrition guidelines at home by showing their parents, caregivers, and siblings how to keep track of food groups from printed documents and digital devices as a form of interactive health literacy.

Communicating about common goals for healthy eating in a family helps to establish social and cultural norms that can build nutrition and health habits for a lifetime. Prior to going to the grocery store, families can use the MyPlate application on their digital devices to negotiate what foods will be purchased and which foods will not be purchased when shopping. From 1992 to 2011, an older Food Pyramid model was promoted by the United States Department of Agriculture (USDA) until research showed that only 16% of Americans ate their meals in alignment with the Food Pyramid guidelines (Neuhauser et al., 2007). People reported that the serving sizes of the MyPyramid was confusing, and the model did not define or categorize some cultural foods. When the MyPyramid food model was replaced with the MyPlate food model in 2011 (Schwartz & Vernarelli, 2019), a serving plate was incorporated as a meal template to guide the amount of each food group to eat for breakfast, lunch, and dinner. As such, the MyPlate food model became a less confusing, simple visual for people of all literacy levels to use and understand. Evidence from a nationally representative sample indicated that subjects who reported using the MyPlate or MyPyramid plans made significantly healthier food choices than subjects who did not use the plans – even after adjusting for age,

sex, race or ethnicity, education, household size, family income, smoking status, beverage energy density, and physical activity (Schwartz & Vernarelli, 2019).

The three purposes of our nutrition intervention with second and third graders was 1) to educate children about the MyPlate food model from the United States Department of Agriculture using interactive health literacy practices; 2) to describe ways that children can practice interactive health literacy when grocery shopping with their family; and 3) to determine if student involvement in classroom meal making increased home meal making events with their family. As such, students were asked three main curricular questions to guide the pretest-posttest intervention: 1) Have you ever seen the MyPlate food picture? 2) Do you go grocery shopping with your family? and 3) Do you cook and prepare meals with your family?

Methods and Materials

Participants in the study included children (N = 126) from three elementary schools within one school district in the midwestern United States. Two of the elementary schools had second grade students participate, and one elementary school had third grade students participate.

The procedures for the current study were to assess students on their nutrition knowledge after a three-hour intervention with guest nutrition educators (n = 15) who were concurrently enrolled in a nutrition course at the local university. Classroom instruction at the elementary schools was led by a faculty member from the university, who was a registered dietitian and instructor of a senior-level nutrition course. The instructor contacted the local school district for the possibility of offering nutrition education in three of the district's elementary schools. Access to the classroom was approved by the district-level school health coordinator and the principals of each elementary school.

The registered dietitian involved her university students as co-instructors (n = 15) during the classroom lessons which were organized and implemented over three days. The three elementary teachers remained in their respective classrooms during the nutrition lessons that were led by the guest nutrition educators. The guest instructors were introduced to the children before sharing the purpose of the nutrition lessons. The learning process included the following methods and materials:

1. A pre-test was given to the children before any nutrition content was shared.

2. Instruction about the MyPlate food model began by the drawing of a MyPlate diagram on the white board and asking students what food groups made up the MyPlate. Each child then selected a three-dimensional plastic food model from the food model box.

Students approached the whiteboard with their plastic food model and then wrote the name of their selected food where it belonged in the MyPlate diagram. If they needed guidance, other students in the class offered to help them. In some classes, one or two children were chosen to write all the food names on the whiteboard while other children in the class identified, named, and placed the food into the MyPlate diagram. Sometimes the classroom teacher suggested which students had good penmanship and spelling to write information on the board and sometimes the guest nutrition educators assisted in writing content on the board with oral responses from the students.

3. The closing activity consisted of each student making a snack called yogonana which contained rice cereal, yogurt, and bananas. While children ate the yogonanas, students identified and named the food items included in the snack and then sorted and categorized each ingredient into a food group on the MyPlate diagram. During the closing discussion of Day 1, students wrote down which foods they ate for breakfast that day. Students were also encouraged to make the Yogonanas with their family at home.

4. On the opening discussion of Day 2, students were asked who made the yogonana food at home with a family member, followed by a review of which food groups made up the yogonana. Only three to four children from each classroom made the snack at home.

Students were asked again what they ate for breakfast and the name of their favorite breakfast foods. Students then categorized their breakfast foods into different food groups on the MyPlate diagram.

5. Students made another snack, which included a tortilla (grain), cheese (dairy), turkey (protein), and vegetables. A rap-music competition followed the snack activity, which involved small groups of students creating lyrics for a rap song about the tortilla snack and the food groups.

6. The concluding activity was a spelling game called "Sparkle" for which students sat in a large circle to be tested on twenty nutrition vocabulary words that had been introduced during the lesson. "Sparkle" began when a vocabulary word was given to the class to spell one letter at a time. The first student in the circle said the first letter of the vocabulary word, then the next student said the second letter of the vocabulary word until the word was completely spelled out by students in the circle. When the vocabulary word was completely spelled out, the next student in the circle shouted the word "Sparkle" to indicate the completed word. If the next student failed to recognize that the word was completed and did not say "Sparkle", that student was determined "out" and was asked to step away from the circle to join any students who misspelled a letter earlier in the game.

7. On Day 3 of the nutrition lessons, a written posttest was given to students with the same three questions as the pretest.

8. The third lesson concluded with students making a snack containing three food groups. The four dips and sauces included: a vanilla yogurt dip served with bananas, apples, and grapes (dairy and fruit); a honey mustard dip with pretzels (grain); buttermilk ranch dip with carrots (dairy and vegetables); and a pizza sauce with mozzarella sticks (vegetables and dairy). Students were encouraged to share the dip recipes with their family at home.

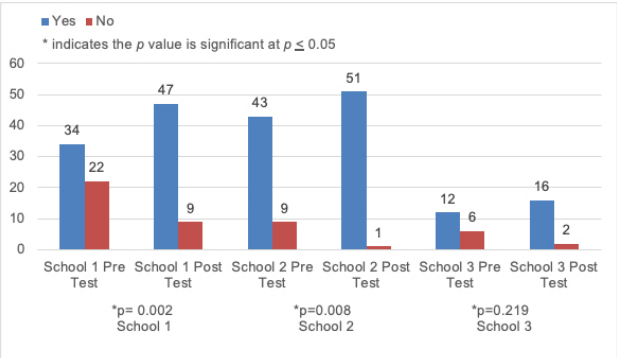
Results

Data analyses were completed using SPSS 25.0 (SPSS, Inc., Chicago, IL). Descriptive statistics captured the means and percentages of the second and third grade students who recalled the MyPlate food picture, went grocery shopping with their family, and helped their family cook and prepare meals. Statistical significance was set at 95% or $p \leq 0.05$.

Results showed that the school-based nutrition lessons were effective in teaching the children about the different food groups as well as familiarizing them with the MyPlate model. For the first research question, "Have you ever seen the MyPlate food picture?"., there was a significant increase ($p < 0.05$) in the number of children who saw the MyPlate food picture before (n = 77) and after (n = 99) the nutrition lessons in the classroom. Figure 1 shows statistically significant differences for children attending School 1 (p = .002) and School 2 (p = .008), but not for School 3 (p = .219).

Figure 1.

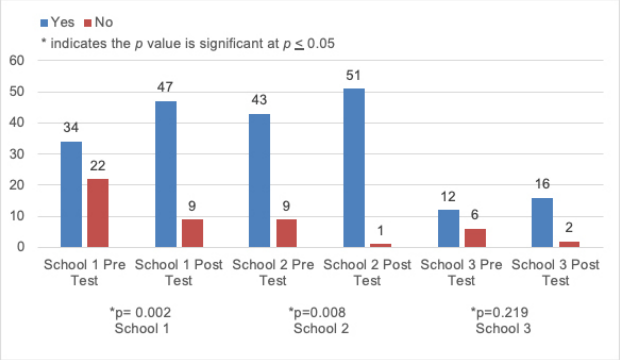
Have you ever seen the MyPlate food picture?



For the second research question, "Do you go grocery shopping with your family?", there was a significant increase (p = 0.05) in the number of children who did grocery shopping with their family before (n = 82) and after (n = 97) the nutrition lessons in the classroom. Figure 2 shows statistically significant differences for children attending School 1 (p = .0001), but not for School 2 (p = .219) or School 3 (p = 1.0).

Figure 2.

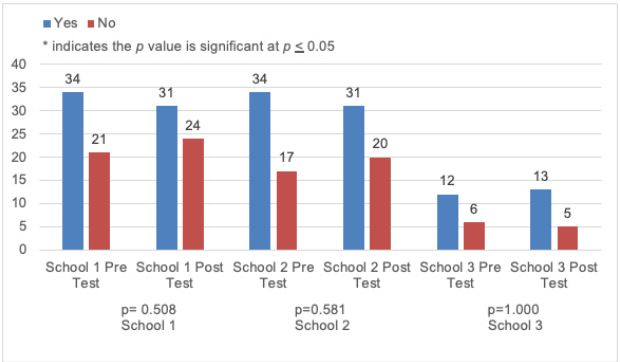
Do you go grocery shopping with your family?



For the third research question, "Do you cook and prepare meals with your family?", no significant results were found between the three elementary schools (Figure 3). On the combined totals for the three schools, 80 students said "yes" on the pretest and 74 students said "yes" on the posttest that they cook and prepare meals with their families. Hence, six fewer students said "yes" after the classroom intervention. For all three schools, 44 students said "no" on the pretest and 49 said "no" on the posttest that they did not cook and prepare meals with their family. Hence, five more students said "no" after the classroom intervention.

Figure 3.

Do you cook and prepare meals with your family?



Discussion

Literacy is a universal skill that allows people to acquire knowledge or understanding at a functional level in society (Mbanda et al., 2021). Health literacy emphasizes the need to also "access valid and reliable health information, products, and services" which is a more sophisticated ability (National Consensus for School Health Education, 2022) than literacy. Hence, functional health literacy is an ability to "function" when demonstrating the universal skills of reading, writing, and speaking in the context of health. Functional health literacy is foundational to interactive health literacy.

Similar when learning literacy skills, children benefit from social role models when learning health-related

skills. The value of social role models to demonstrate consistent eating behaviors and healthy habits (Bandura, 1986) can be beneficial whether the role models come from observations in person, in print, or in electronic materials. Health-literacy informed interventions (Morrison, 2019) that aim to strengthen children's self-efficacy beliefs when making healthy choices are crucial for forming nutrition habits (Bandura, 1986). Self-efficacy beliefs support children when taking action to eat foods from the MyPlate model. Hence, school-based nutrition lessons taught by competent teachers can help children to gain confidence in healthy eating. In schools, the hidden curriculum is strongly related to cultural and academic capital (McIntee et al, 2018, p. 16), so students who would not usually have exposure to an equitable nutrition experience can gain health knowledge, attitudes, and practices about nutrition through a federal guideline like the MyPlate food model. Visual learning in nutrition has been shown to increase food choices among kindergarten to grade five children in a structured grocery aisle setting with image-based labeling (Privitera et al, 2015). Visual textual learning is also promoted in children's cookbooks (Christensen & Wistoft, 2022), a curriculum of children's picture books about food and nutrition in different community settings (Ubbes & Spillman, 2000), and a vegetable liking survey of food and nutrition research with children (Ubbes, Killeen et al., 2023).

Our first research question was to investigate if there was a significant increase ($p < 0.05$) in the number of children who were able to recognize the MyPlate food picture before and after the nutrition intervention. Results indicate that classroom teachers should teach the MyPlate food model as one way for children to practice functional health literacy skills in second and third grade. By downloading and using the MyPlate app from the United States Department of Agriculture website, interactive health literacy can also be practiced. Interactive health literacy is defined as "interpersonal communication between people, including their interactive use of print and electronic materials for health enhancement" (Ubbes & Ausherman, 2018). By interacting with valid and reliable health information from the MyPlate app, children may be more motivated to learn about nutrition and practice the skill of decision making for improved nutrition. Since goals can energize and direct motivation (Schunk & DiBenedetto, 2021, p. 2), and goal setting is a "mental representation of what one is attempting to gain" (Schunk & DiBenedetto, 2021, p. 2), students can also practice goal setting with the MyPlate app. Students who learn about the MyPlate application at school (https://www.choosemyplate.gov/node/5760) can also serve as advocates for health in their home environments by showing their parents, caregivers, and siblings how to organize their meals and keep track of food group goals on printed MyPlate food models or digital devices. The MyPlate food model is structured so that all food groups are consumed in moderation. Eating too much of one food group can be detrimental to one's health and cause adverse health effects (Miller et al, 2022). Because the MyPlate food model is designed with a specified amount for each food group, individuals can plan a balanced diet to improve their functional health and prevent disease.

In the United States, the Health Education Curriculum Analysis Tool (HECAT) is designed to help schools evaluate and improve their health education curricula for nine priority health topics, which includes food and nutrition (Centers for Disease Prevention and Control, 2024). Teachers could benefit greatly from the HECAT to ensure that nutrition and health are being taught, along with the MyPlate food model. Even though Crisman and colleagues (2020) found that teachers and principals lack knowledge about the MyPlate model, and are not required to use the MyPlate as part of their core curriculum due to limited curriculum time, valid and reliable health information is still needed for children and their families. Teachers could be encouraged by the current study, because the National Health Education Standards focus on student use of media (Standard 2) and student demonstration of health literacy (Standard 3) when learning about health (National Consensus for School Health Education, 2022). For example, Standard 3 focuses on students demonstrating "health literacy by accessing valid and reliable health information, products, and services to enhance health". By the end of second grade, teachers can help students meet several performance expectations for Standard 3 such as: 3.2.1 Use functional health literacy (e.g., reading, writing, and speaking) to access trustworthy health information to learn functional health knowledge; 3.2.3 Demonstrate interactive health literacy by talking with a trusted adult to obtain valid and reliable health information; 3.5.1 Use functional health literacy skills (e.g., reading, writing, and speaking) to access valid and reliable health information to learn about health behaviors; 3.5.5 Read a variety of print material (e.g., books, magazines, billboards) from valid and reliable health resources to develop functional health knowledge; and 3.5.6 Interpret visual and numerical representations (e.g., graphs, figures, tables, charts) to understand a health product; and 3.8.9 Access credible websites or health-related applications using technology to support health behaviors.

For our second research goal, there was a significant increase in the number of children who did grocery shopping with their family from the pretest to the posttest. This is a promising finding because the three nutrition lessons influenced the interactive health literacy skills of the children. Physical participation in grocery shopping and food preparation are often the

precursors to more elaborations in health-related talk and conversations. Oral and written language will help to reinforce literacy skills, build a food vocabulary, and refine word spelling (Leyva et al, 2012). According to a study, spelling is one of the most difficult aspects of writing for children in third and fourth grades (Harlin & Lipa, 1993, p. 292). Since writing is an expressive form of language development, making a grocery list from a recipe or from the MyPlate food model supports children's functional health knowledge about food and helps them to translate nutrition information into potential health behaviors. Since it is important to reinforce health concepts with multimodal approaches (Ubbes & Njoku, 2022), writing and then using a grocery list while shopping becomes what Rumenapp et al (2023) calls an interactive health literacy event. Based on the current research, we suggest that grocery shopping with a list and meal preparation from recipes are examples of interactive health literacy events, especially if there are opportunities for nutrition-related conversations.

According to Pettersson et al (2004), "... a public place such as the grocery store facilitates pedagogical situations and can work as a tool for informal education". When parents and children go grocery shopping together, there are numerous opportunities for interactive health literacy to occur, as well as opportunities for parents to model healthy food selections (Lively et al., 2017). According to Calderon and colleagues (2017), children initiate 70% of parent-child interactions while at the grocery store by using verbal communication, pointing gestures, grabbing an item, and carrying the food to the register themselves. Morrison et al (2019) have noted that 1 in 4 parents have low health literacy that affects their ability to use valid and reliable health information to make health decisions for their children. Thus, parents with low health literacy have a negative effect on their own nutrition knowledge and behaviors with potential challenges for their children's health. The term 'low health literacy' is defined as having a limited ability to read, write, and speak about health with interactive health literacy requiring a higher cognitive ability (Pawellek, et al., 2022). Lower cognitive abilities can have negative consequences for adults who may have unnecessary hospitalizations, higher risk of medication errors, higher health care costs, and higher mortality rates (Berkman et al., 2011).

In a systematic review of longitudinal cohort studies, Tandon et al (2016) found that a healthier diet was associated with better neurocognitive outcomes for young children. Given that early childhood from six months to five years of age are critical for neurocognitive development, parents need to be good role models and meal planners for their children's health from the beginning of their young lives and throughout their school years. As social role models for their children, parents control their children's access and preparation of foods at home in addition to influencing their attitudes towards certain foods and food groups (Suggs et al., 2018). Nutrition learned in the early stages of development will shape how a child views and practices nutrition into adulthood, including how they will eventually model food preferences and dietary behaviors for their own children. According to Mollborn and Lawrence (2018), a child's health behaviors are generally consistent and largely impacted by the family until a child reaches adolescence when peers often become a greater influence. While in kindergarten and elementary school, children do not have much control over what groceries are purchased, when meals are eaten, or where meals are eaten. Sugg et al (2018) found that "Eating at home with the family appears to be associated with higher intake of fruit, vegetables and dairy and a lower consumption of soft drinks than eating in other social settings". By eating more nutritious meals at home with the assumption that there are adequate family resources and food knowledge, children can demonstrate developmentally appropriate school readiness (Mollborn & Lawrence, 2018).

Previous studies have shown positive outcomes between a variety of dietary behaviors when children are involved in purchasing food ingredients, preparing a meal, or setting the table (Quelly, 2019). Child involvement in meal making and food preparation leads to a better diet and overall quality of health (Smith et al., 2013). According to Quelly (2019), a child's involvement with meals was positively associated with eating more fruits and vegetables and inversely associated with the consumption of soft drinks and fast foods.

Children can also influence their parents through purchases at the grocery store. Children and their parents need to make decisions about what food and health-related products to be placed on the grocery list. A source states, "... the three stages – configuration, negotiation and outcome – can be considered in the decision-making process in families" (Pettersson et al., 2004). The configuration stage involves the writing of the grocery list; negotiation involves the interactive shopping, talking, and purchasing process at the grocery store; and the outcome involves the groceries that are taken home to make a meal through an interactive health literacy event. Grocery shopping is seen as a social practice between parents and their children (Keller & Ruus, 2004). While in the grocery store, interactive conversations between children and parents may occur. Pettersson et al (2004) found that some parents listened and talked to their children and then provided feedback on specific items that were being selected in the grocery store. Other parents in the study were dismissive and did not involve their children in the food shopping process. This could be for several

reasons. First, parents might be in a hurry with limited time. Page et al (2018) found that the time spent in a grocery store increased by ten percent when a child was present during the shopping event. Parents have more recently increased their use of food delivery apps to facilitate convenient and quick food delivery (Tandon et al., 2021), which may reduce opportunities for the development of interactive health literacy skills between children and their parents. Second, parents may plan to stick to their grocery list to structure and itemize their family budgets whereas children maybe more impulsive when they see a food they like or want their parents to buy. Although many factors influence a child's request for a specific grocery item, children try to influence grocery shopping decisions as young as eighteen months to two years of age (Calderon et al., 2017), and both parents and children face numerous pressures in co-shopping as a social practice (Keller & Ruus, 2014). Third, parents may not be knowledgeable about a variety of healthful food options and may lack valid and reliable health information to tell their children during the grocery shopping experience. According to a study of 100 parent-child or grandparent-grandchild dyads during a 30 minute shopping trip, children made 144 food requests with only one interaction involving a nutrition education attempt by a parent to their child (Calderon et al., 2017). The most common responses from parents were "no reaction" (24%), followed by a hard "no" (22%) and an explanation (17%) (Calderon et al., 2017).

The third research goal was to increase student involvement in meal making at home. Results were essentially the same on the pretest to posttest question, "Do you help your family cook and prepare meals?". Although there was an increase in students who recorded that they cooked meals with their families, the results were not significant. In the classroom intervention, students prepared three different snacks over three days consisting of multiple food groups. Students were encouraged to make the food at home which could increase the transfer of nutrition education knowledge and skills to home and hypothetically reinforce what students had learned at school. Many children were eager to share one of the recipes with their family at home. However, there were barriers that inhibited the children from actually remaking the food such as another meal being planned that evening, or the need to buy ingredients before the snack could be made. A more thoughtful coordination between the school curriculum and home life plans could help to reduce future barriers. Future studies should study these barriers because taking the time to purchase nutritious foods to cook and prepare meals is extremely important to health. Unfortunately, "In 2000, 41% of Americans reported eating ≥ 3 commercially prepared meals/week due to the lack of cooking skills and perceived time constraints" (Muzaffar et al., 2018). By making health literacy more explicit in school to home transactions and home to community transactions, educators and parents can elevate functional health literacy and interactive health literacy as key components of learning about health. In the future, the MyPlate print and electronic versions of the federal nutrition guidelines could be one mechanism for raising awareness and elevating the transfer of valid and reliable health information between the school and home. Educators could provide written recipes and a grocery list organized by the MyPlate food model for children to take home to share with their family after meal making in the classroom. Children could practice writing the genres of recipes and grocery lists in the classroom to share and use at home as examples of health literacy. The printed or electronic material serves as a bridge for building interactive health literacy by increasing adult-child conversations about nutrition and health from school to home environments, and vice versa. Parents may need explicit guidelines on how to become competent in "health talk" through the use of question prompts to elicit basic conversations that can be answered in single words or sentences and elicitation prompts to cue more complex conversations with longer explanations (Hanner et al., 2019). When children communicate topic-related knowledge via oral and written language, they are said to understand or comprehend the health information as long as teachers and parents are checking for understanding and accuracy.

In summary, the current research served as a pilot study for determining the effectiveness of a nutrition education intervention with a meal making component that was replicated across three school buildings with second and third graders. The study is limited by a convenience sample of elementary children who attended one of three elementary schools in a semi-rural district in the midwestern United States. Without a control group, these findings cannot be generalized beyond younger or older-aged children. The research is also limited by self-reported responses from elementary children who may not have understood the three research questions due to low literacy or low health literacy skills. Also, the intertextual or cross-situational connections that children make between school and home environments are difficult to observe and quantify. For example, if the students answered that they go grocery shopping with their parents, it does not imply that they engaged in health-related conversations about grocery items or collaborated on the shopping list. Nonetheless, without this pilot study, we would have lacked adequate background knowledge on second and third graders abilities in health literacy. Going forward, this study will help us write more robust quantitative questions for future research on child health literacy. Future qualitative research could transcribe the oral conversations and

understandings of elementary students and their classroom teachers to further explore what children think, feel, and believe about their food-related learning and health literacy skills at school and at home.

In conclusion, two of the three research questions resulted in significant findings for whether children improved their recognition of the MyPlate food model from the U.S. Department of Agriculture and whether they went grocery shopping with their family after a nutrition intervention with a meal making component in the school classroom. How these findings related to functional health literacy and interactive health literacy were described. Second and third graders demonstrated functional health literacy by reading, writing, and speaking about nutrition and health in the school classroom. Interactive health literacy accounted for the interpersonal conversations and written answers about food and nutrition that children shared with their teachers and peers. Interactive health literacy also included the ability for children to interact and learn about the MyPlate food model as a valid and reliable print and electronic material associated with meal planning and meal making. The role of written recipes and a grocery list organized by the MyPlate food model are suggested improvements for building interactive health literacy skills among children, their families, and peers. Teachers and curriculum decision makers should incorporate the Health Education Curriculum Analysis Tool and the National Health Education Standards when planning health education lessons for the development of health literacy skills and child nutrition.

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Measuring School Well-Being in Primary Education: A Systematic Review

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Abstract

The aim was to explore the literature for instruments that assess school well-being, identifying their design features and construct appropriateness. A systematic review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020, and the PICO strategy to formulate the research questions. Fifty-two articles on instruments to assess pupils' school well-being were analysed using an interpretive approach. The results showed that school well-being is a topic of global interest, with China standing out, with non-uniform growth since 2007, being most notable in 2018 and 2019. Longitudinal and qualitative studies have appeared more frequently in recent years. The presence of multidimensional instruments stood out, with no consensus on the identification of the items to be assessed from a holistic perspective. This study paves the way for the design of a questionnaire that operationalise school well-being, considering not only the literature, but also the direct perceptions of pupils.

Keywords:

School Well-Being, Instruments, Primary School Pupils, Systematic Review

Introduction

Child well-being is a major concern in recent decades due to the increase in psychological and mental health problems at an early age (Carter & Andersen, 2023; Kutsar et al., 2019). A priority focus of attention for child well-being is the school environment, as school is the place where children spend a large part of their daily lives interacting with their peers (Cevikbas, 2021; Gempp & González-Carrasco, 2021; Hossain et al., 2023). School is a source of human development and of happiness and satisfaction for children, an environment in which they can develop their sense of belonging, security and personal development (Calp, 2020; Cevikbas, 2021).

Nowadays, school well-being is widely recognized as a multidimensional concept (Carter & Andersen, 2023; Fanchini et al., 2019; Konu & Rimpela, 2002) made up of cognitive elements (satisfaction with school life and affect), psychological elements (self-actualization and personal development) and social elements (student interactions with other people in the school system) (Losada-Puente

et al., 2022). The experiences that children between the ages of 6 and 12 have at school - a stage that in many education systems is a transition from Primary to Secondary - will mark their later experiences (Cevikbas, 2021; Enríquez et al., 2022; Su et al., 2019). Assessing school well-being at this stage represents a challenge, not only because of the intrinsic complexity of the psychosocial development of students in this period (Kellock, 2020), but also because of the difficulty of operationalising and measuring a construct for which there is still a fragmented body of work, with a diversity of conceptual approaches and relationships with other concepts (Hossain et al., 2023). For instance, the literature review on the conceptualisation of well-being carried out by Losada-Puente et al. (2022) concluded, after analysing 53 studies in the period 2002-2020, that there are multiple ways of approaching the construct, depending on the perspective, theory or model adopted, which makes it difficult to reach an agreement on what the defining elements of positive school experience are.

Hence, it is necessary to investigate more deeply how the construct is being measured by the studies conducted so far, in order to check for commonalities and discrepancies between them, and to see to what extent these measures of school well-being are direct (i.e. focused on what defines the construct) or indirect (i.e. through concepts related to school well-being, such as life satisfaction, happiness, emotions, etc. or one or more of its dimensions, such as school conditions, peer and teacher-student relationships, school climate, meanings of achievement, school engagement, among others (Anderson and Graham, 2016; Calp, 2020; Konu and Rimpela, 2002; Ramírez-Casas and Alfaro-Inzunza, 2018; Tian et al., 2016, 2018).

Moreover, current research highlights the need to study these elements from the point of view of the student himself (Anderson & Graham, 2016; Estola et al., 2013; Mendiri et al., 2024) whereas, until now, measurements have either been based on adults' views of what they understand wellbeing to be at school (Estola et al., 2013), or have been based on instruments designed for adults and adapted for children (Stasulane, 2017) and therefore far removed from children's voices about what it means for them to be well at school (Anderson and Graham, 2016; Kutsar et al., 2019). As Calp (2020) notes, "people can look different and think different" (p. 318) and, in the case of the students, their ideas and thoughts about school are a key and distinct element of the adult world. Hence the interest in delving deeper into the pupils' school experience at this educational stage through a systematic literature review study with the aim of improving the theoretical understanding of school well-being and, from there, drawing useful conclusions for decision-making on how to measure the construct of school well-being in primary education.

The general purpose was further elaborated into three specific objectives: (a) to explore the scientific literature for instruments assessing school well-being; (b) to identify the type of measure (direct or indirect) used in the instruments explored; (c) to examine the place of student voice in the design of the instruments; and (c) to further study the characteristics of the instruments and their suitability for assessing school well-being from a broad view of the concept.

Material and Method

This study followed a systematic review methodology through which research is searched, evaluated, and synthesized, following a step-by-step, rigorous, transparent, and replicable procedure to guarantee the reliability of the findings (Grant & Booth, 2009). The systematic review of the international literature was conducted using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 (Page et al., 2021). This format allowed us to carry out an exhaustive and comprehensive collection and analysis of the literature, explore the current state of knowledge and offer recommendations that may be useful for practice and for future research (Grant & Booth, 2009).

Research strategy

Four internationally renowned databases were used to search for empirical studies between 2002 and 2021: Scopus and Web of Science (general), ERIC (specific to Education) and PsycInfo (specific to Psychology). All the database searches were limited to English-language peer-reviewed articles. The research questions that drove the review followed the PICO strategy (Patient/Problem, Intervention, Comparison group and Outcome) (Miller, 2001), namely, what kind of instruments has been designed to assess pupils' school well-being? To what extent these instruments are sufficient, complete, and exhaustive to assess the breadth of this concept and how it is understood and expressed by the pupils? What is the starting point adopted to design these instruments (scientific literature, school professionals and other educational agents, pupils, etc.)? Relying on these questions, the keywords were established considering each letter from the PICO strategy (table 1).

Inclusion and exclusion criteria

After a comprehensive definition of keywords, inclusion and exclusion search criteria were outlined and applied to by means of database filters. Inclusion criteria included: (a) studies between 2002-2021 that used instruments to measure school well-being of pupils aged 6-12 in the period. The beginning was established in 2002 due to the publication of Well-being in schools: a conceptual model by Anne Konu and Matti Rimpelä, an article that established a

Table 1.
PICO strategy: elements and keywords.

Elements	Description	Keywords
Participants	Studies focused on pupils aged 6-12 (primary school and/or lower high school), both based on pupils' perceptions or on other educational agents (e.g. teachers). Research measuring school well-being of pupils in early childhood education (< 6 years), or upper high school (> 12 years), or general well-being, was eliminated.	Primary Education; Elementary Education
Interventions	Studies with an ex-post-facto design and literature reviews were included. Both those that considered only school well-being and others that included other variables were considered.	School wellbeing; school well-being
Comparison	This criterion was not relevant in this research.	
Outputs	Studies that present results obtained using instruments for measuring school well-being of pupils aged 6-12.	Journal; journal book; book; book series; book chapter; chapter; article; journal article; reports – descriptive; reports – evaluative; reports – research; numerical/quantitative data; test/questionnaires

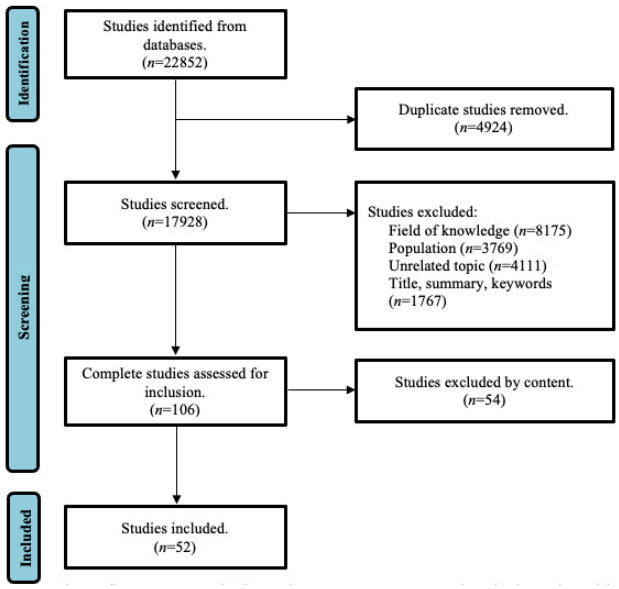
conceptual model of school well-being that has served as a framework for some subsequent studies; (b) studies in English, French, Portuguese, and Spanish were included, as these are the languages in which most studies on this subject have been found (Losada-Puente et al., 2022); and (c) only peer-reviewed scientific articles and books to ensure greater rigor in the information collected. As for the exclusion criteria, there were not included: (a) studies measuring school well-being of pupils under 6 years or over 12; (b) studies published before 2002; and (c) publications that were not in article or book format. These inclusion and exclusion criteria were applied by means of database filters.

Study selection procedure

Under the above inclusion and exclusion criteria, 22852 studies were identified (*n* = 890 ERIC, *n* = 6351 PsycInfo, *n* = 4008 Scopus, *n* = 11603 WoS). The final selection was conducted through the procedure specified in PRISMA 2020 (Page et al., 2021) and it is graphically represented in figure 1.

The identified studies were examined, filtering the duplicated ones using an Excel sheet (*n* = 4924). The remaining 17928 studies were analysed according to the area of knowledge, population, related topic, title, abstract and keywords. There were excluded studies that were not classified as belonging to social sciences or psychology (*n* = 8175), corresponding to the primary or lower high school education (*n* = 3769), and /or focused on school well-being (*n* = 4111). Regarding the title, abstract and keywords, there were only included those publications on instruments that measured well-being quantitatively and/or qualitatively, either exclusively or in combination with other variables. Instruments that did not meet these characteristics were therefore discarded (*n* = 1767).

Figure 1.
Flow diagram of the study selection procedure through PRISMA



After refinement, a total of 106 documents were comprehensively reviewed in the Mendeley reference manager. A new checking on the sample adequacy – pupils aged 6-12 (primary school and/or lower high school) – was conducted. Fifty-four documents were eliminated, thereby obtaining 52 documents to be analysed.

Results

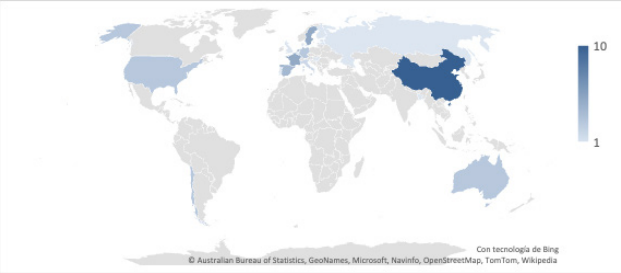
Descriptive analysis

School well-being is a topic of worldwide interest (Figure 2). China is the country that leads its study (*n* = 10) followed by France and Sweden (*n* = 5), Spain (*n* = 4) and Australia, Germany, Chile, the US, and the Netherlands (*n* = 3). Italy addresses it twice and Bangladesh, Portugal, Belgium, Estonia,

Denmark, Finland, Hungary, Latvia, United Kingdom, Russia and Slovenia only one under the selection conditions. Despite the predominance of China, they concentrated on the European continent (*n* = 32), compared to the Asian (*n* = 11), the American (*n* = 6) and the Oceanic (*n* = 3), not identifying any on Africa.

Figure 2.

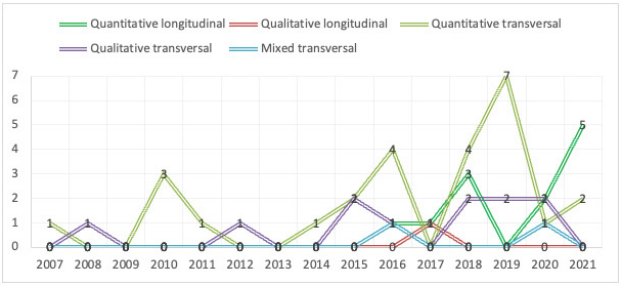
Geographical distribution of the study of school well-being in Primary/ Low Secondary School.



The study on the measurement of school well-being began to represent a topic of interest since 2007 (figure 3), increasing in recent years - especially in 2018 (*n* = 9) and 2019 (*n* = 9) - in a non-uniform way (no research was found under our requirements in 2009 and 2013).

Figure 3.

Typology of studies about school wellbeing (2007-2021).



Mostly, the study of school well-being has presented a quantitative research design (*n* = 38; figure 3), especially the cross-sectional. More recently longitudinal quantitative studies began to be designed, experiencing an increase over the last years, especially in 2021 (*n* = 5) – except in 2019 (*n* = 0) –. Qualitative research (*n* = 12) was addressed for the first time in 2008 and, since 2015, they began to have a greater presence, with one or two articles per year – except in 2017 and 2021 –. Other typologies with less weight were longitudinal qualitative (2017 *n* = 1) and mixed cross-sectional (2016 and 2020 *n* = 1 each).

The studies analysed focused on pupils (n= 51), both exclusively on Primary Education or equivalent (elementary school, basic education, among others) (*n* = 30), and later educational stages (*n* = 21). Only one document was referred to the family's perspective on the school well-being of their children. Four studied the first years of Primary Education (1-2nd year or equivalent), 39 focused on later years (3-6th year or equivalent) and nine addressed the entire educational stage. Six articles contained information from teachers, guidance counsellors, principals, and external observers.

Analysis of the characteristics and properties of the instruments

An exhaustive study of the 85 instruments was carried out, differentiating according to the types of measurements: unidimensional (Table 2) and made up of scales/subscales (Table 3) quantitative instruments, multidimensional quantitative instruments (Table 4), and qualitative instruments (Table 5).

A total of 16 unidimensional instruments are presented in Table 2, including both original publications and secondary sources. It highlighted the use of Rosenberg's scale (1965, as cited in Liu et al., 2021; Yang et al., 2018) almost 60 years after its design and publication. Mostly, school well-being was measured by some of its components; e.g. satisfaction with school life (Bacro et al., 2017; Murillo & Martínez, 2018; Randolph et al., 2010), the sense of belonging (Dunleavy & Burkey, 2019; Tian et al., 2016) or commitment to school (Košir et al. 2007), the self-esteem (Liu et al., 2021; Yang et al., 2018), the school canteen (Horton & Forsbertg, 2020), the academic achievement (Renshaw, 2015), the acceptance of peers (Weyns et al., 2021) or the school justice (Ehrhardt-Madapathi et al., 2018). Only four instruments specifically assessed school well-being (Gempp & González-Carrasco, 2012; Košir et al., 2007; Weyns et al., 2021). To a greater or lesser level of precision, all included tests of validity and reliability, except for the Anti-Bullying Organization questionnaire (Horton & Forsberg, 2020), the Self-Reported Academic Achievement (Renshaw, 2015) and the Teacher report of students 'well-being in school (Košir et al., 2007).

Unidimensional measures including scales/subscales were referred to in Table 3. There were 26 instruments designed ad hoc (n = 23) or cited in secondary sources (n = 3), whose use continues more than 20 years after their publication (Ehrhardt-Madapathi et al., 2018; Košir et al., 2007; Murillo & Martínez, 2018). General school well-being was a central focus in five studies (Alfaro et al., 2016; Ehrhardt-Madapathi et al., 2018; Terjestam et al., 2016; Van der Ploeg et al., 2016; Zanobini & Viterbori, 2021). The remainder studied dimensions of school subjective well-being (Chen et al., 2020; Liu et al., 2021; Liu et al., 2015; Perret et al., 2019; Renshaw & Chenier, 2018; Su et al., 2019; Tian et al., 2018; Tian et al., 2016; Tian et al., 2020; Yang et al., 2018; Yi et al., 2020) or psychological well-being (Askell-Williams et al., 2018), as well as components of school well-being, e.g. school satisfaction (Hossain et al., 2019) and satisfaction of basic psychological needs at school (Conesa & Duñabeitia, 2021; Liu et al., 2021; Su et al., 2019; Tian et al., 2018), school engagement (Yi et al.,

2020), adaptation (Perret et al., 2019) and performance (Bacro et al., 2017; Murillo & Martinez, 2018; Zhang et al., 1999), academic attitudes (Pyne et al., 2018), attitudes and behaviours toward school (Chen et al., 2020; Ehrhardt-Madapathi et al., 2018; Klatte et al., 2010; Liu et al., 2021; Su et al., 2019; Tian et al., 2018), risk of bullying (Bochaver et al., 2019), academic and personal support (Košir et al., 2007), and teacher-student relationships (Weyns et al., 2021). Less than half of the studies presented evidence of validity. In some cases, just some of its scales/subscales (Askell-Williams et al., 2018; Hossain et al., 2019). The reliability of the majority was specified by means of α.

The multidimensional measure of school well-being was used in 22 instruments (Table 4), although a minority focused directly on school well-being (Anderson & Graham, 2016; Astolfi et al., 2019; Bacro et al., 2017; Dettmers et al., 2019; Fanchini et al., 2019; Sabri et al. 2015). Most instruments evaluate the construct based on one of its dimensions (for instance, school social well-being, in Chiva-Bartoll et al., 2020), or related concepts, e.g. justice in the classroom (Ehrhardt-Madapathi et al., 2018), acoustics (Astolfi et al., 2019; Klatte et al., 2010), self-concept (Murillo & Martínez, 2018), school satisfaction (Alfaro et al., 2016), belonging (Conboy et al., 2015), and safety (Nelen et al., 2021), motivation and teaching practice (Thoonen et al., 2011), classroom and playground climate (Filella et al., 2016), facilitators and risks of educational outcomes (Renshaw, 2015), bullying (Buda & Szirmai, 2010) and school segregation (Fouquet-Chauprade, 2014). Evidence of validity was found in half of the instruments studied. Reliability was studied by all of them, except in Fouquet-Chauprade (2014), Klatte et al. (2010), Renshaw (2015).

Table 2.

Unidimensional instruments for quantitative measure of school well-being.

Instrument	Validity	Reliability*	Source
Cuestionario sobre la Satisfacción del estudiante con la escuela (Murillo and Martínez, 2018)	Non-specified	α =.81	Murillo & Martínez (2018)
Questionary (Organización anti-bullying, 2011)	Non-specified	Non-specified	Horton & Forsberg (2020)
Adaptation of the Chilean Early-Childhood Longitudinal Survey (Gempp and González-Carrasc, 2021)	CFA: 7 factors (RMSEA = .01 [.61 - .84])	ρ =.86	Gempp & González-Carrasco (2021)
Scale of Well-Being in School (Keller et al., 1996)	Non-specified	α =.90*	Košir et al. (2007)
School well-being scale (Weyns et al., 2021)	Non-specified	α =.88 (Year 4), .87 (Year 5) e .86 (Year 6)	Weyns et al. (2021)
The Children's Overall Satisfaction with Schooling Scale (Randolph et al., 2011)	Non-specified	α =.92, r_{xy}=.76 (5 weeks) (finish version); α =.90, r_{xy} =.69 (5 weeks)	Randolph et al. (2010)
Échelle de satisfaction scolaire (Guimard et al., 2015)	Non-specified	α =.78 (T1) and .76 (T2)*	Bacro et al. (2017)
The School Belonging Scale (Anderman, 2002)	Non-specified	α =.78	Tian et al. (2016)
The behavioral and cognitive engagement in schoolwork scale (Assor et al., 2002)	Non-specified	α =.74*	Košir et al. (2007)
The Psychological Sense of School Membership (Goodenow, 1993)	Non specified	α ≤ .80	Dunleavy & Burke (2019)
Rosenberg's Self-Esteem Scale (Rosenberg, 1965)	CFA (Yang et al., 2018): χ^2/ df (n = 807) = 3.86 (p <.001), RMSEA = .06, CFI = .98, TLI = .96*	α (Liu et al., 2021) =.85-.87, α (Yang et al., 2018) =.86 (T1), .90 (T2) and .89 (T3)*	Liu et al. (2021), Yang et al. (2018)
Self-Reported Academic Achievement (Renshaw, 2015)	Non-specified	Non specified	Renshaw (2015)
Teacher-Report Scale (Driessen et al., 2000)	Non-specified	α =.86 (Year 4), .88 (Year 5) e .87 (Year 6)*	Weyns et al. (2021)
Teacher report of students' academic engagement (Košir et al., 2007)	Non-specified	α =.91	Košir et al. (2007)
Teacher report of students' well-being in school (Košir et al., 2007)	Non-specified	Non-specified	Košir et al. (2007)
Vignette stories (Ehrhardt-Madapathi et al., 2018)	CFA: 1 factor (χ^2 = 131.376, df = 6, p\.001, RMSEA = .108, CFI = .964, SRMR = .031)	α =.66-.76	Ehrhardt-Madapathi et al. (2018)

*Extracted from the primary or secondary source analysed.

Table 3.

Unidimensional instruments for quantitative measure of school well-being with different scales/subscales.

Instrument	Scale/subscale	Validity	Reliability*	Source
Classroom Life Instrument (Johnson et al., 1983)	Peer Academic Support Scale	Non-specified	α =.68*	Košir et al. (2007)
	Peer Personal Support Scale		α =.78*	
	Teacher Academic Support Scale		α =.70*	
	Teacher Personal Support Scale		α =.74*	
Well-being questionnaire (Wustmann, 2012)	Positive emotions scale No problems scale	Non-specified	α =.78-.82*	Ehrhardt-Madapathi et al. (2018)
No-named (Terjestam et al., 2016)	Well-being at school scale	Non-specified	α =.71	Terjestam et al. (2016)
	Psychological distress scale		α =.75	
	General Stress Scale		α =.69	
	Strengths and difficulties subscale Peer Problems scale		α =.53	
	Effortful control scale		α =.92	
No-named (Kärnä et al., 2011)	Change in well-being at school: general liking for school, academic self-concept, classroom atmosphere and school climate	Non-specified	α =.88	Van der Ploeg et al. (2016)
Questionario sul benessere scolastico (Marzocchi and Tobia, 2015)	Five non-specified subscales	Non-specified	α =.82*	Zanobini and Viterbori (2021)
Student Subjective Wellbeing Questionnaire (Renshaw, 2015)	Four subscales: Academic Efficacy; Educational Purpose; Joy of Learning; and School Connectedness	CFA: 4 factors (χ^2 =161.43, df = 98, p <.001, CFI =.972, RMSEA [90%CI] =.038 [.028, .049])	H/α ≥ .70	Perret et al. (2019), Renshaw (2015), Renshaw & Chenier (2018)
No-named (Askell-Williams et al., 2018)	Happiness at School	Non specified	Non-specified	Askell-Williams et al. (2018)
	School Satisfaction scale	CFA: CFI =.99, TLI =.98, RMSEA =.04, SRMR =.02	H =.93	
Fragebogen zur Erfassung Emotionaler und Sozialer Schulerfahrungen von Grundschulkindern (Rauer and Schuck, 2004)	Seven scales: Social integration; class atmosphere; relation to the teachers; academic self-concept; achievement motivation; pleasure of learning; and school attitude	Non-specified	Non-specified	Klatte et al. (2010) Ehrhardt-Madapathi et al. (2018)
	Joy of learning subscale: happiness and positive emotions in school daily tasks and positive attitudes toward school tasks and school subjects	Non-specified	α =.64-.74*	
Primary School Upper Grade Students' Prosocial Behaviors Questionnaire (Feng, 2009)	4 subscales: altruistic Behavior; behavior abided by rules; social behavior; and otherness behavior subscale	CFA: 1 factor (χ^2/df = 4.61, CFI =.97, TLI =.95, RMSEA =.07)	α =.87 (T1), .90 (T2) and .92 (T3) ω =.88 (T1), .91 (T2) and .93 (T3)*	Chen et al. (2020)
			α =.94 (T1)*	Liu et al. (2021),
			α =.94 (T1), .95 (T2) and .95 (T3)*	Su et al. (2019),
		CFA: 1 factor (χ^2(12) =40.04, CFI =.99, TLI =.98, SRMR =.02, RMSEA =.05)*	α =.90 (T3)*	Tian et al. (2018)
Left-behind Children's Social Behavior Questionnaire (Chen, 2008)	Antisocial Behavior subscale	CFA: 1 factor (χ^2(4) = 20.30, CFI =.99, TLI =.98, SRMR =.02, RMSEA =.07)*	α =.81*	Tian et al. (2018)
Strengths and Difficulties Questionnaire by teachers (Goodman, 1997)	Five subscales: emotional symptoms; conduct problems; hyperactivity-inattention; peer relationship problems; and prosocial behaviour subscale	Non-specified	α =.72-.90	Ehrhardt-Madapathi et al. (2018)
Questionnaires sur les performances scolaires (Bacro et al., 2017)	Questionnaire sur les performances scolaires en français Questionnaire sur les performances scolaires en mathématiques	Non-specified	Non-specified	Bacro et al. (2017)
Survey questionnaire (Hossain, 2019)	The school satisfaction subscale of the Multidimensional Students' Life Satisfaction Scale	Quality of School Life Scale (*r* =.68)	α =.89	Hossain et al. (2019)
	Experience with School Scale: perceived control at school, perceived academic support from teachers, perception of student-teacher relationships, perception of relationships with peers and perception of country support in education	Non-specified	α =.70-.90	
International Survey on Children's Well-Being (The International Society of Child Indicators, ISCI, 2012)	Various instruments, not all specified (Overall Life Satisfaction Scale, Brief Multidimensional Student Life Satisfaction Scale, Personal Well Being Index School Children, etc.)	Non-specified	Non-specified	Alfaro et al. (2016)

Table 3.

Unidimensional instruments for quantitative measure of school well-being with different scales/subscales.

Instrument	Scale/subscale	Validity	Reliability*	Source
Malleable Social-Psychological Academic Attitudes survey (Pyne et al., 2018)	School Trust scale	EFA: 6 factors (68% variance), CFA: 6 factors (χ^2 = 469.66 [df = 137], CFI = .93, RMSEA = .05 [p = .83])	α =.74	Pyne et al. (2018)
	Social Belonging scale		α =.76	
	Evaluation Anxiety scale		α =.79	
	Self-Complexity scale		α =.69	
	External Locus of Control scale		α =.83	
	Identification with School scale		α =.73	
School Bullying Risk Survey (Bochaver et al., 2019)	The insecurity scale: degree of normalization of disrespect, insecurity and disregard for rules and boundaries.	EFA: 4 factors (Non specified), CFA: 4 factors (χ^2 =1928, df = 2, CMIN/DF =.96, NFI =.98, CFI =1.000, RMSEA =.00)	α =.73	Bochaver et al. (2019)
	The wellbeing scale: stability of boundaries, compliance with rules and confirmation that group members respect each other.		α =.60	
	The disunity scale: lack of cohesion		α =.67	
	The equality scale: ability of the group members to accept differences, role distribution and to participate in constructive and positive communication		α =.56	
Brief Adolescents' Subjective Well-Being in School Scale (Tian et al., 2015)	School Satisfaction Subscale: academic performance, school management, teacher-student relationships, peers' relationship, academic learning	EFA: 6 factors (54.69% variance), CFA: 2 factors (χ^2 =92.385, df =19; TLI =.942, CFI = .961, RMSEA (90% CI) =.071[.057-.086], SRMR =.035)	α =.82	Chen et al. (2020), Liu et al. (2021), Su et al. (2019), Tian et al. (2018), Tian et al. (2016), Tian et al. (2020), Yang et al. (2018), Yi et al. (2020)
			r_{xy} =.43-.71	
	Affect in School Subscale: positive and negative affects		Non-specified	
Elementary School Students' Subjective Well-Being in School Scale (Lin et al., 2015)	School Satisfaction Subscale: academic learning, achievements, school management, teacher-student relationship, peers' relationship, learning	EFA: 6 factors (68.01% variance), CFA: 6 factors (χ^2 =510.824, df =215), p\.01, CFI =.96, RMSEA =.051, SRMR =.037), The School Subscale of the MSLSS (r =.57, p <.01)	Guttman =.72-.86, α =.70-.91	Liu et al. (2015)
	Positive Affect in School Subscale	EFA: 1 factor (65.42% variance), CFA: 1 factor (χ^2 =26.63, df =5, p\.01, CFI =.96, RMSEA =.071, SRMR =.038), The Delighted Terrible Face Scale (r =-.47, p <.01)	Guttman =.71, α =.76	
	Negative Affect in School Subscale	EFA: 1 factor (67.07% variance), CFA: 1 factor (χ^2 =16.84, df=5, p>.01, CFI = .98, RMSEA = .067, SRMR = .022), DTFS (r = .49, p < .01)	Guttman =.78, α =.84	
Adolescent Students' Basic Psychological Needs at School Scale (Tian et al., 2014).	The Need for Autonomy subscale	CFA: 3 factors (χ^2 =166.12, df =87, p <.01, CFI =.98, NNFI =.97, RMSEA =.054, 90% CI [.042-.067], SRMR =.048)	Guttman =.77, α =.85, r_{xy} =.73 (5 weeks)	Liu et al. (2021), Su et al. (2019), Tian et al. (2018)
	The Need for Relatedness subscale		Guttman =.69, α =.80, r_{xy}=.71 (5 weeks)	Liu et al. (2021)
	The Need for Competence subscale		Guttman =.61, α =.77, r_{xy} =.74 (5 weeks)	Liu et al. (2021)
Basic Psychological Needs Satisfaction in the Classroom Scale (Conesa and Duñabeitia, 2021)	Autonomy satisfaction subscale	CFA: 4 factors (χ^2 =222.06, p< 0.001, χ^2/df =1.96, CFI =.99, TLI =.99, SRMR =.04, RMSEA =.03)	α =.72, ω =.72	Conesa & Duñabeitia (2021)
	Competence satisfaction subscale		α =.76, ω =.76	
	Relatedness satisfaction subscale		α =.78, ω =.79	
	Novelty satisfaction subscale		α =.78, ω =.77	
School Adjustment Scale (Congard et al., 2016)	The Academic Adjustment subscale: academic outcomes, attention, autonomy, and motivation	Non-specified	α =.95*	Perret et al. (2019)
School Engagement Scale (Fredricks et al, 2005)	Cognitive engagement subscale	Non-specified	α =.81 (T1) and .83 (T2)*	Yi et al. (2020)
	Behavioural engagement subscale		α =.71 (T1) and .73 (T3)*	
Achievement Goals Scale (Zhang et al., 1999)	The Mastery Goals subscale	Non-specified	α =.79 (T1)*	Yi et al. (2020)
	The Performance-Approach Goals subscale		.70 (T1)*	
	The Performance-Avoidance Goals subscale		α =.68 (T1)*	
Student-Teacher Relationship Scale (Koomen et al., 2007; Pianta, 2001)	The Conflict subscale	Non-specified	α =.88 (Year 4), .88 (Year 5) and .85 (Year 6)*	Weyns et al. (2021)
Performance tests (LLECE, 2001)	Math performance tests	Non-specified	α =.89*	Murillo & Martínez (2018)
	Language performance tests		α =.92*	

*Extracted from the primary or secondary source analysed.

Table 4.

Multidimensional instruments for quantitative measure of school well-being.

Instrument	Dimensions	Validity	Reliability*	Source
High/low inference justice rating instrument provided by Teachers/Observers (Ehrhardt et al., 2016)	HIR_T_Appropriateness of praise and criticism	EFA: 3 factors (57% variance)	α =.61	Ehrhardt-Madapathi et al. (2018)
	HIR_T_Adaptive learning settings		α =.61	
	HIR_T_Rnsuring learning opportunities		α =.61	
	HIR_O_Adaptive learning settings	EFA: 3 factors (46% variance)	α =.60	
	HIR_O_Respectful teacher interaction		α =.44	
	HIR_O_Appropriateness of praise and criticism		α =.41	
	LIR_O_Supportive performance feedback	EFA: 4 factors (53% variance)	α =.61	
	LIR_O_Enforcing class rules		α =.87	
	LIR_OLIR_Respectful interactions		α =.44	
	LIR_OLIR_Acceptance of the child		α =.42	
The well-being questionnaire (Sabri et al., 2015)	Self-esteem; emotional health; relationships at home and with peers; enjoy at school; happiness scale	Non-specified	α =.69*	Astolfi et al. (2019)
Questionnaire multidimensionnel de bien-être à l'école (Guimard et al., 2015)	Satisfaction with school activities	Convergent validity: school satisfaction =.33-.46, Divergent validity: progressive matrix = 0-.09	α =.71-.72, r_{xy} =.70-.75	Bacro et al. (2017)
	Relationship with teachers	Convergent validity: school satisfaction =.37-.40, Divergent validity: progressive matrix =.05-.16	α =.65-.70, r_{xy} =.50-.64	
	Satisfaction with the classroom	Convergent validity: school satisfaction =.29-.36, Divergent validity: progressive matrix =.02-.18	α =.62-.68, r_{xy}=.50-.74	
	Relationship with peers	Convergent validity: school satisfaction =.05-.20, Divergent validity: progressive matrix = 0-.07	α =.75-.78, r_{xy}=.70-.71	
	Feeling of safety	Convergent validity: school satisfaction =.02-.16, Divergent validity: progressive matrix =.0-.06	α =.72-.76, r_{xy}=.05-.42	
	Relationship with assessment	Convergent validity: school satisfaction =.05-.10, Divergent validity: progressive matrix = .04-.06)	α =.63-.73, r_{xy}=.65-.68	
No-named (Fanchini et al., 2019)	School well-being (negative emotion; engagement; competency; positive emotion)	CFA: RMSEA =.03; CFI, TLI =.97	KR-20=.33-.56	Fanchini et al. (2019)
	Creativity at school (interest in new things and intrinsic motivation)		KR-20=.50-.64	
No-named (Buda and Szirmai, 2010)	Children's sense of well-being at school (mood at school, occurrence of psychosomatic symptoms and attitudes towards school)	Non-specified	α = .81	Buda & Szirmai (2010)
No-named (Conboy et al., 2015)	Valorização pessoal/intrínseca	EFA: 3 factors (51.3% variance), CFA: χ^2 = 3.49 (p =.073), CFI =.99, PNFI = .62, RMSEA(90% IC) =.034, RMSEA (p < .05) =.85	α =.74	Conboy et al. (2015)
	Valorização no sentido prático//utilitarista		α =.80	
	Sentimentos de Pertença e Bem-Estar		α =.78	
No-named (Fouquet-Chauprade, 2011)	School and class environment; relations between the students, with the teachers and with other adults of the school institution; image; and reputation of the school, the students, and the neighbourhood	Non specified	Non specified	Fouquet-Chauprade (2014)
No-named (Thoonen et al., 2011)	Student motivation (well-being in class, well-being at school, academic self-efficacy, intrinsic motivation, mastery goals, and performance-avoidance goals); and student behaviour (school investment)	CFA: non-specified	α =.59-.81	Thoonen et al. (2011)
	Teaching practice (process-oriented instruction, connection to the world of students, cooperative learning, and differentiation); and teacher self-efficacy	CFA: Non-specified	α = .73-.81	Thoonen et al. (2011)

Table 4.

Multidimensional instruments for quantitative measure of school well-being.

Instrument	Dimensions	Validity	Reliability*	Source
Students' Social Wellbeing at School questionnaire (Moliner et al., 2020)	Achievement; cooperation; cohesion; coexistence; attitude towards school; attitude towards diversity; solidarity	EFA: 7 factors (53.9% variance), CFA: 7 factors (CFI =.92, GFI =.90, χ^2/df =2.13, RMR =.05).	α =.91, r_{xy} =.70, Guttman =.67	Chiva-Bartoll et al. (2020)
Cuestionario de clima social del aula (Pérez et al., 2010)	Relationship; communication; interest; satisfaction	Experts' judgement	Non specified	Filella et al. (2016)
Cuestionario del clima del patio (Filella et al., 2016)	Four non-specified dimensions.	Experts' judgement	α =.84	Filella et al. (2016)
The noise questionnaire (Henze, 2006)	Noise inside the classroom; noise from outside	Non-specified	Non-specified	Klatte et al. (2010)
The noise questionnaire (adaptation) (Astolfi et al., 2019)	Perceived disturbance from specific noise sources; perceived intensity and disturbance of noise during school activities carried out in silence or in a group; and perceived voice quality while a classmate asks a question and while the teacher explains	Non-specified	α =.71	Astolfi et al. (2019)
No-named (Dettmers et al., 2019)	Effective family-school communication; parental participation in homework. Well-being (at home and at school); and school achievement (in mathematics and in language)	Non-specified	α =.74-.95	Dettmers et al. (2019)
Youth's Risks and Assets Survey (Renshaw, 2015)	Risks: reception of aggression, perpetration of aggression, substance use, self-harm, and languishing effect. Assets: reception of social support, provision of social support, physical exercise, participation in enjoyable activities, and prosperous effect.	Non-specified	Non specified	Renshaw (2015)
No-named (Mooij et al., 2011)	Perception of safety in school; unacceptable behaviour; harassment of students; and perceived need for additional interventions to improve social safety in and around the school.	Non-specified	α =.61-.97*	Nelen et al. (2021)
No-named (Anderson and Graham, 2016)	Conceptualization of well-being; importance of relationships; have a voice and recognition (peers and teachers) in well-being.	Non-specified	α =.70-.92	Anderson & Graham (2016)
Índice General de Satisfacción por Ámbitos (Casas et al., 2013)	School	Non-specified	α =.78*	Alfaro et al. (2016)
Test de autoconcepto (Murillo and Martínez, 2018)	Academic self-concept (reading, mathematics, and general school self-concept); non-academic self-concept (scale of physical abilities, physical appearance, peer relations and relations with parents) and general self-concept	Non-specified	α =.94	Murillo and Martínez (2018)

*Extracted from the primary or secondary source analysed.

Twenty-one qualitative instruments developed ad hoc were found (Table 5), in which the use of interviews stood out. Eight of them were focused on school well-being (Anderson & Graham, 2016; Kellock, 2020; Kutsar et al., 2019; Roffey, 2008; Simmons et al., 2015; Stasulane, 2017), while the rest studied one dimension: social well-being (Chiva-Bartoll et al., 2020), basic psychological needs (Holt et al., 2019), pleasant and unpleasant situations (Ramírez-Casas & Alfaro-Inzunza, 2018), meaningful situations (Bergmark & Kostenius, 2018), variables in class sessions (Murillo & Martínez, 2018), conflicts in recess (Filella et al., 2016), activities in class and at recess (Holt et al., 2019), school improvement (Backman et al., 2012) and happiness (Backman, 2016).

Table 5.

Qualitative instruments for measuring school well-being.

Instrument	Contents	Source
Pupils focus groups (Anderson and Graham, 2016)	Well-being (pupils' individual definitions; who they perceive as support networks; discussions about how they feel to be cared for, respected, and valued; imagining an ideal school that would support their well-being).	Anderson & Graham (2016)
Pupils focus groups (Chiva-Bartoll et al., 2020)	Service-learning experience on social well-being.	Chiva-Bartoll et al. (2020)
Focus group discussions (Stasulane, 2017)	School well-being and its dimensions.	Stasulane (2017)
Semi-structured interviews with focus groups (Simmons et al., 2015)	School well-being (definition; who they consider as sources of support; how the concept of recognition is perceived in relation to well-being; what an ideal school for well-being would be like).	Simmons et al. (2015)
Semi-structured interviews with focus groups (Kutsar et al., 2019)	Well-being at school (learning environment, bullying among peers, what they would like to change at school...).	Kutsar et al. (2019)
Semi-structured interviews with focus groups (Holt et al., 2019)	Autonomy, competence, and relationship.	Holt et al. (2019)
Semi-structured interviews with focus groups Ramírez-Casas and Alfaro-Inzunza (2018)	Pleasant/unpleasant situations in the school experience.	Ramírez-Casas and Alfaro-Inzunza (2018)
Semi-structured interviews with focus groups (Bergmark and Kostenius, 2018)	Significant situations at school.	Bergmark & Kostenius (2018)
Individual interviews Stasulane (2017)	Daily life.	Stasulane (2017)
Semi-structured interviews with pupils, teachers, school principals and counsellors (Roffey, 2008)	School well-being (feelings about school and how the school ethic contributed to their own and others' well-being, how people's feelings are considered, what helps people get along, how and by whom school culture changes).	Roffey (2008)
Semi-structured interviews with teachers and school principals (Anderson and Graham, 2016)	Well-being (how they define it, whether and to what extent educational policy shape their understanding and approach, how they perceive that well-being is facilitated in their schools, the impact of leadership on school well-being, the relationship between teacher and student well-being and how the concept of recognition is perceived in relation to well-being).	Anderson & Graham (2016)
Semi-structured interviews with teachers (Chiva-Bartoll et al., 2020)	Programme and its impact on factors related to the pupils' social well-being.	Chiva-Bartoll et al. (2020)
Classroom checklist Murillo and Martínez (2018)	Stable or objective variables (size, luminosity, cleanliness, etc.) before the sessions, activities during a class hour and elements and variables during a session.	Murillo & Martínez (2018)
Anecdotic record of problematic behaviours in courtyard (Filella et al., 2016)	Conflicts during recess.	Filella et al. (2016)
Field diary (Holt et al., 2019)	Activities controlled by the teacher within the lessons and voluntary activities during recess.	Holt et al. (2019)
Written reflections from students (Backman et al., 2012)	How they would make school the best place to learn.	Backman et al. (2012)
Written reflections from students (Backman, 2016)	Good experiences at school and how they would make school the best place to learn.	Backman (2016)
Field diary, digital narrative, posters, role-playing, and drawings (Bergmark and Kostenius, 2018)	Significant situations at school.	Bergmark and Kostenius (2018)
Drawings, maps, photographs, notes and discuss transcriptions (Kellock, 2020)	School well-being status.	Kellock (2020)

Discussion and conclusions

This research deeply analysed the scientific literature on the measurement of school well-being in primary and lower secondary school students to find answers to the research questions formulated through the PICO strategy. Its research spans the globe, highlighting the primary and lower secondary education stage in China, France, and Sweden. Spain is below them. Note that other stages may show different results, as noted by Losada-Puente et al. (2022). For example, it is striking that Australia has a low ranking, given the importance that its educational and non-educational policies give to childhood school well-being (Simmons et al., 2015).

In response to our first objective, which was to explore, through the scientific literature, the instruments for assessing school well-being, a former finding reinforces the initial hypothesis regarding the lack of definition of the construct of school well-being, with the consequent limitations when it comes to operationalising it. In spite of the most recent evidence pointing to the predominant multidimensional operationalisation of school well-being, integrating scales/subscales (Renshaw, 2015), there is no consensus on the determination of the dimensions that make it up, sometimes leading to partial or perhaps incomplete assessments. This seems problematic because it keeps open the debate about what we mean by school well-being and how to measure it accurately.

In addition to this lack of specificity in the definition of its components or dimensions, in response to the second objective of the present study, which was to identify the type of measures - direct or indirect - of the construct, we have found a tendency to equate it with related but not equivalent constructs (e.g. satisfaction with school life, school engagement, peer relations, feelings of belonging to school, etc.). Previous studies propose a holistic assessment (Fanchini et al., 2019; Konu & Rimpela, 2002), combining different points of view (Stasulane, 2017), namely: subjective, psychological, and social (Losada-Puente et al., 2022).

Focusing attention on examining the place of student voice in the design of instruments for measuring student well-being in schools, as the third objective of this study, we found a predominance of quantitative measures allows school well-being to be quantified objectively and comparably, resulting in useful information for educational research and practice; nevertheless, the design of these instruments may be questioned. Students' feelings and perceptions towards school experience can be explored in many ways, such as surveys, metaphors, drawings, etc. (Cevikbas, 2021), but certainly the beginning for the design of an instrument should be the voice of the students (Anderson & Graham, 2016; Stasulane, 2017; Bergmark & Kostenius, 2018) as paying attention to their point of view represents the improvement of education policy and practice around student well-being in schools (Simmons et al., 2015). Starting from a qualitative study - as observed in current research trends (Chiva-Bartoll et al., 2020; Enriquez et al., 2022; Filella et al., 2016; Kellock, 2020; Mendiri et al., 2024) - is an extremely interesting resource to find out first-hand what students think about their school experience, what they consider important, and how they define what it means to feel good at school.

Finally, the aim was to reflect in depth on the characteristics of the instruments designed so far and their suitability for the assessment of well-being from a broad view of the concept. This paper reflects the complexity underlying the operationalisation of student well-being. Different ways of assessing the construct are indicative of the variety of ways of conceptualising it. The risk lies in unnecessarily confounding the construction of instruments (Hussain et al., 2023) or even in generating narrow lines of enquiry by omitting other important domains in light of the most recent findings in the field. Do not forget that the way each student perceives and lives their experiences in the school space are different and significant, which prevents us from referring to a single and common way of expressing what it means for them to be well at school, although it is possible to delimit some axes of influence on the child's school life (Requejo et al., 2022) at a subjective, psychological and social level (Losada-Puente et al., 2022). This has also been a limitation of the present study, justified by the decisions taken to organise and group too complex and varied information. This has been resolved by triangulating each phase of the analytical process between researchers, thus reducing the risk of bias in the inclusion/exclusion of studies. Other limitations worth mentioning are the conceptualisation of the educational stage concerning 6-12 years in different countries around the world, and the language bias, by discarding studies that were not published in English, Spanish, French or Portuguese. The profuse scientific production in China raises the possibility of losing information published in this language.

Despite these limitations, relevant conclusions with scientific and practical implications for the study of school well-being are derived: (a) it should be studied from a multidimensional and holistic approach, incorporating the traditional subjective and psychological perspectives, alongside the social perspective (Losada-Puente et al., 2022), which highlight the relevance of relationships with peers and other educational agents in the school space (Chen et al., 2020; Bochaver et al., 2019; Su et al., 2019; Weyns et al., 2021); and (b) it should be measured through students perceptions, considering their voice and opinion on what is important to them (Bergmark & Kostenius, 2018; Enríquez et al., 2022; Holt et al., 2019;

Mendiri et al., 2024; Requejo et al., 2022; Simmons et al., 2015). Continuing this line of research will make it possible to establish a list of indicators of what is important in their school experience, leading to the construction of an instrument of school well-being from a holistic perspective.

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Teacher Emotions and Teacher Self-Regulation: Insights from Teachers' Perspectives

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Abstract

In this paper, we aimed to explore the connection between teacher emotion and self-regulation, the predictive power of teacher emotions on teacher self-regulation, and factors that influence teachers' emotions. An exploratory sequential design was adopted in the study. Data was gathered from 403 teachers teaching actively in elementary grades in the quantitative dimension. In the qualitative dimension, a focus group interview was held with eight teachers. The Teacher Emotion Questionnaire (TEQ), The Teacher Self-Regulation Scale, and focus group interview questions were used to collect data. The quantitative data was analyzed through correlational analysis and simple linear regression analysis and the qualitative data was analyzed through content analysis. The quantitative findings demonstrated that teachers' pride and love in the profession significantly predicted teacher self-regulation levels; however, predicted only 2% of the variability in teacher self-regulation. The findings from the qualitative dimension seemed to explain why we did not find significant relationships between teacher self-regulation and teacher emotions. Emotions seem to be unrelated to teaching skills. Instead, the teachers attribute the source of their emotions mostly to external factors and individual characteristics to some extent.

Keywords:

Teacher Emotions, Teacher Self-Regulation, Pride, Joy, Predictive Power

Introduction

Teachers experience several emotions in their profession. Happiness, anger, pride, or pity are some of them (Frenzel, 2014). Although there is no strong consensus, the literature demonstrates that emotions experienced by teachers are classified into two categories, positive and negative. Happiness (Frenzel et al., 2009; Sutton & Wheatley, 2003), love (Rodrigo-Ruiz, 2016) and pride (Darby, 2008; Sutton & Harper, 2009) are among the emotions that are often mentioned in the category of positive emotions, whereas the category of negative emotions refers mostly to anger (Frenzel, 2014; Sutton & Wheatley, 2003), anxiety (Frenzel, 2014; Sutton & Wheatley, 2003), shame, and guilt (Frenzel, 2014). Teachers' emotions are at the core of the teaching-learning process. Taking teachers' feelings into account at schools leads to increased teaching performance (Argon,

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2015) and improved teaching practices (Tsang, 2018).

Among teachers, being in a positive emotional state involves a variety of uplifting and inspiring emotions that can directly affect their teaching methods, interactions with students, and general academic and professional performance. These emotions contribute to the development of a good class climate; boost the engagement level of the students, and enhance teaching performance (Fredrickson, 2001; Jennings & Greenberg, 2009; Rimm-Kaufman et al. 2015). One of these emotions is joy. Several studies found that joy can have positive implications for student success (Fredrickson, 2003; Lyubomirsky et al. 2005; Pekrun et al. 2002). Teachers who are joyful are generally more likely to be energetic, creative, and passionate about what they do. Emotional contagion, which transfers teachers' mood to the students has a beneficial effect on the classroom atmosphere creating positive mood (Frenzel et al., 2009; Jennings & Greenberg, 2009). The interaction between joy and student engagement demonstrates the possibility of improved learning experiences. Addressing these issues can lead to enhanced teacher happiness, which can improve teaching practices (Hakanen et al., 2006; Reeve, 2013).

A caring and compassionate teacher-student interaction contributes to a pleasant emotional atmosphere. Love, as an emotion rooted in real concern for the well-being and growth of students, is crucial in shaping these relationships (Noddings, 2005). Roorda et al. (2011) draws attention to the importance of instructors' loving and caring behavior in the classroom, fostering a sense of safety and belonging, and promoting student involvement and motivation. Furthermore, the emotional bond between teacher and student might contribute to improved academic achievement and general development (Hamre & Pianta, 2001; Wentzel, 2012). Recognizing the cultural and environmental variations that influence the expression and perception of teacher-student love is critical to ensuring that it remains suitable and conducive to learning (Pianta & Stuhlman, 2004). Likewise, witnessing children's triumphs and progress inspires teacher pride. Teachers who take joy in their students' accomplishments instill a sense of efficacy and competence in their students. This good mood helps teachers stay motivated, committed, and satisfied at work (Frenzel et al., 2009).

Negative emotions are also an unavoidable aspect of the teaching profession and can have serious consequences for both teachers and students. For instance, anger is defined as the emotional state of frustration, irritation, or discontent that teachers experience in response to various triggers in the classroom or in their professional environment (Sutton & Wheatley, 2003). According to Sutton and Harper (2009), teachers, like any other person, might become enraged as a result of causes such as student misbehavior, classroom disturbances, difficult administrative decisions, a lack of support, or crushing workloads. Research indicates that prolonged anger in teachers can have negative implications such as low job satisfaction, strained teacher-student relationships, and compromised instructional efficacy. Similarly, fatigue, often known as emotional tiredness, is another common negative emotion caused by the demanding nature of the profession. Marcionetti and Castelli (2022) point out that fatigue can result from constant contact with students, administrative tasks, and the emotional investment required for effective teaching. Teachers' enthusiasm, energy, and overall well-being might suffer from fatigue. Teacher fatigue has ramifications that go beyond the individual, hurting instructional quality and student participation (Blömeke et al., 2016; Skaalvik & Skaalvik, 2018). Finally, hopelessness occurs when teachers believe difficulties to be insurmountable or feel powerless to impact positive change. Day and Gu (2014) imply that this negative mood might be triggered by causes such as low student accomplishment, insufficient resources, or a lack of professional development opportunities. Hopelessness among teachers can stifle creativity, innovation, and enthusiasm to invest in students' achievement (Kyriacou, 2021). The study of teacher emotion has acquired substantial attention in educational research, reflecting a growing appreciation of the intricate interplay between educators' emotions and their professional practices (Frenzel et al., 2007). Researchers have investigated several elements, such as classroom dynamics, that affect the genesis and management of these emotions (Brackett et al. 2010; Sutton & Wheatley, 2003).

Another dimension that also influences the practice of teaching is teachers' self-regulation. Teachers are often perceived as self-guided actors within the classroom environment (Randi, 2004). They depend on their self-regulating capacities to plan, perform, and evaluate their teaching methods. Teachers should be able to regulate themselves to deal with the dynamics of the teaching/learning process (Delfino et al., 2010). Teachers' self-regulation denotes their ability to manage their thoughts, emotions, and actions proactively and adaptively within the classroom context. It involves purposefully designing and applying teaching techniques, maintaining resilience amidst emotional challenges, and flexibly responding to diverse student needs and classroom disruptions. The capacity of teachers to regulate themselves in various aspects such as setting goals, maintaining intrinsic motivation, managing emotions, and seeking assistance plays a pivotal role in elevating the quality of teaching and enriching student learning outcomes (Kunter et al., 2013; Skaalvik & Skaalvik, 2018; Tschannen-Moran & Woolfolk-Hoy, 2007). By effectively navigating these dimensions of self-regulation, educators can

cultivate robust self-regulated learning strategies, which are essential for fostering an engaging and productive learning environment in the classroom (Monshi-Toussi et al. 2011; Çapa-Aydın et al., 2009).

Studies on job-related emotions show that individuals who demonstrate elevated levels of engagement in their professional endeavors are likely to encounter transient episodes characterized by enthusiasm and active involvement (Ouweneel et al., 2012, Xanthopoulou et al. 2012). Research on teachers' emotions, on the other hand, indicates that teachers' emotions stem from their interactions with students in the classroom (e.g. Chen, 2016; Cross & Hong, 2012; Sutton & Wheatley, 2003). Teachers report feeling joyful when they see their students making progress and enjoying learning. On the flip side, teachers encounter difficulties when attempting to interact with students and boost their academic progress, particularly when students fail to take responsibility for their own learning (Chen, 2020). This lack of student ownership creates tensions for teachers as they seek to facilitate effective learning experiences. These findings suggest a relationship between teacher emotions and teacher self-regulation, which is considered as one of the fundamental skills for creating an effective learning environment. Teachers who can handle classroom situations, adjust teaching methods, solicit feedback, reflect on their practices, cope with stress, and nurture positive connections with students are likely to contribute to students' learning and progress by creating a conducive learning environment thus experiencing more positive emotions. On the other hand, teachers who struggle with self-regulation in the teaching process may face negative emotions.

Nevertheless, to the best of our knowledge, neither the predictive power of teachers' emotions on teachers' self-regulation nor their reflections in the classroom have been investigated yet. In this paper, we aim to explore the connection between teacher emotion and self-regulation, the predictive power of teacher emotions on teacher self-regulation, and factors that influence teachers' emotions.

Thus, in the current study, we sought answers to the following research questions:

1. Does teacher self-regulation predict teacher emotions?

2. In the views of the teachers, what are the factors that affect teacher emotions?

Methodology

Design of The Study

For this study, an exploratory sequential design was adopted. This approach is commonly used in mixed methods research and comprises two interconnected phases: an initial quantitative phase followed by a subsequent qualitative phase. Researchers typically employ this design when qualitative insights are needed to clarify significant or nonsignificant quantitative findings. (Plano-Clark & Creswell, 2015). In this study, in the quantitative phase, data was obtained from a larger sample of teachers with two scales (Teacher Emotion and Teacher Self-Regulation), and in the qualitative phase, semi-structured focus group interviews were held with teachers to further understand the antecedents of teacher emotions.

Participants

A convenience sampling technique was used to determine the participants in the quantitative phase (Klassen et al., 2012). Data was gathered from 403 teachers teaching actively in elementary grades in Türkiye. However, teachers with missing information in the surveys were excluded from the dataset. Therefore, the analyses were conducted with 384 teachers (M= 55; F= 329). Only volunteer teachers were included.

In the qualitative phase of the study, a focus group interview was held with eight teachers. Maximum variation sampling (Palinkas et al., 2015) was employed to ensure the inclusion of opinions from teachers in both early childhood and primary school settings. The teachers worked in eight different elementary schools. Four of them were engaged in early childhood teaching, while four were teaching in the primary grades. All teachers had a bachelor's degree. The ages of the teachers ranged between 24 and 52, with the most experienced teacher having served for 30 years, while the most novice teacher has been in service for 2 years. The teachers were contacted through direct outreach with personalized emails to the selected teachers that fit our criteria, explaining the purpose of the focus group interview and inviting them to participate. Those who were interested and willing to participate voluntarily responded directly to our email, expressing their consent and availability. All teachers were assured of confidentiality and informed consent was obtained prior to their participation.

Data Collection Instruments

Teacher Emotion Questionnaire

The Teacher Emotion Questionnaire (TEQ) was developed by Burić, Slišković, and Macuka (2018) and adapted to Turkish by Yurtseven (2020). The TEQ is a psychometric-based scale that was developed to explain teachers' emotions with a multidimensional approach. Teachers respond on a five-point Likert-type scale (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree. The scale consists of six dimensions that measure teacher emotions. These dimensions are joy, pride, love, anger, fatigue/exhaustion, and hopelessness. EFA and CFA

analysis for the Turkish form verified the six-factor structure of the scale. The Cronbach alpha coefficient values were between .71 and .92 for the subscales in the Turkish form.

Teacher Self-Regulation Scale

The Teacher Self-Regulation Scale, developed and validated by Çapa-Aydın et al. (2009), was used. The scale was developed based on Zimmerman's (2002) self–regulation model. It consists of 40 items that the teachers respond to on a 6-point Likert scale ('strongly disagree' to 'strongly agree'. The scale comprises 9 factors, namely; (1) goal setting; (2) intrinsic interest; (3) performance goal; (4) mastery goal; (5) self-instruction; (6) emotional control; (7) self-evaluation; (8) self-reaction and (9) help-seeking. Higher scores represent higher levels of self-regulatory strategy used in teaching. Confirmatory factor analysis validates the nine-factor structure (CFI (.98), NFI (.98), and RMSEA (.06), all the item loadings are significant and they are above the .50 standard. Internal consistency coefficients range from .62 to .86. for the nine factors.

Focus Group Interview Questions

For the focus group interviews, semi-structured interview forms were used. Focus group interview questions were prepared to understand how teacher emotions are formed. In this respect, two questions were asked "What kind of emotions do you experience during teaching in your classrooms?" and "What do you think affects these emotions?" The focus group interview was conducted in Turkish, which was the native language of the teachers. Excerpts from teachers' views were translated into English by researchers for reporting purposes. The interview was conducted via a cloud-based video conferencing platform and lasted approximately 95 minutes.

Data Collection Procedure

For the quantitative phase of the study, after ethics committee approval, District National Education Directorates were contacted for data collection. In line with the guidance of the directorate, teachers were contacted by email, and consent forms and scales prepared in electronic environments were delivered to the participants via email.

For the qualitative phase of the study, again, District National Education Directorates were contacted. With their reference, the teachers were contacted by email or phone. Volunteer teachers were invited to focus group interviews.

Data Analysis

The quantitative data was analyzed through correlational analysis and simple linear regression analysis. The qualitative data was analyzed through content analysis. For the validity and reliability of the qualitative part of the study, Lincoln and Guba's (1986) terms of credibility, transferability, dependability, and confirmability were ensured. To ensure credibility, two focus group interviews with different groups of teachers were held. For the transferability, data collection, data analysis, and research setting were explained in detail. For dependability, two researchers analyzed the focus group data independently, and to enhance the analysis process, the data were coded independently by the two raters based on the recommendation proposed by Joffe (2011). Researchers then compared their interpretations of the main themes. When a consensus could not be reached, the data was returned to reach a consensus.

Findings

Findings on the Predictive Power of Teacher Emotions on Teacher Self-Regulation

Descriptive statistics for the variables examined in the study are presented in Table 1, along with the correlation coefficients between teacher emotions and teacher self-regulation variables.

Table 1.
Descriptive Statistics and Correlation Coefficients for Teacher Emotions and Teacher Self-Regulation

Variables	Min.	Max.	M	SS	r
Teacher Self-Regulation	162	239	207.33	15.23	-
Joy	23	25	24.92	.31	.04
Pride	15	30	28.98	2.13	.15*
Love	23	30	29.45	1.24	.26*
Anger	5	25	10.54	5.07	.01
Fatigue/Exhaustion	7	35	16.80	7.55	.05
Hopelessness	6	30	11.86	5.96	-.00

$p < .01$

As per the information in Table 1, there is a significant positive correlation between teachers' self-regulation and the emotions of Pride and Love they experience towards their profession, r (368) = .15, $p < .01$. However, no significant correlations were observed between teachers' emotions of Joy, Anger, Fatigue/Exhaustion, and Hopelessness, and their self-regulation. To investigate whether teachers' levels of pride and love predict their self-regulation levels, Simple Linear Regression Analysis was conducted. Table 2 presents the analysis results.

Table 2.
Regression analysis results for the prediction of teacher emotions by teacher self-regulation

	R	R^2	F	Std. E	β	t
Pride	.15	.02	8.43*	.37	.15	2.90*
Love	.26	.07	26.51*	.26	.15	5.15*

$p < .01$

According to the analysis results, teachers' pride in the profession significantly predicted teacher self-regulation levels, [$F(1, 366) = 8.43$, $p < .01$]. Their pride in the profession explained 2% of the variability in teachers' self-regulation. In addition, teachers' love for the profession significantly predicted teacher self-regulation levels, [$F(1, 366) = 26.51$, $p < .01$]. Their love for the profession explained 2% of the variability in teachers' self-regulation.

Findings on the Views of the Teachers about Teacher Emotions and Teacher Self-Regulation

Data from the focus group interviews about the factors that affect teacher emotions revealed two themes: external factors and individual factors. Table 3 shows the content analysis related to themes, categories, and sample codes.

Table 3

Content Analysis on The Factors that Affect Teacher Emotions

Theme	Category	Sample Codes
External Factors	Work Conditions	Working hours, Salary, Perceived workload, Demands from the administration, Duty
	School Context	Curriculum, Administrative support, Supportive relationships, Professional development opportunities, Parents' feedback, Peer relationships
	Classroom Context	Learning progress, Repeated errors, Repeated instruction, Student engagement, student behavior, Disobeying rules
Individual Factors	Characteristics	Calmness, Enthusiasm, Nervousness, Cheerfulness, Friendliness, Ambitiousness, Conscientiousness
	Capabilities	Self-efficacy, Resilience, Problem-solving capacity, Coping, Self-confidence, Autonomy
	Dispositions	Cognition, Beliefs, Motivation, Personal goals, Commitment

External factors

Three categories, namely, work conditions, school context, and classroom context, emerged under this theme.

Work conditions. The teachers generally referred to working hours, their perceived workload, and the daily responsibilities that they needed to fulfill in line with the demands of the administration, paperwork, and material development, emphasizing that the amount of work demanded influenced their emotions in this category. They often associated this with negative feelings that paved the way for anger and fatigue. They also frequently mentioned their salaries and underlined that being underpaid affected their emotions negatively. Below are some statements regarding this category:

> *"As a teacher, my emotions are strongly influenced by the demands of my job environment. Balancing my job, administrative responsibilities, and material development can sometimes be difficult, causing frustration and exhaustion. Furthermore, feeling undervalued owing to low salaries adds stress and has a bad impact on my emotions." (T8, 42, Female)*

> *"Balancing the demands of my job with personal commitments can be challenging, especially when I work long hours. However, knowing that my work directly impacts the lives of students motivates me to persevere and maintain a strong sense of dedication." (T2, 26, Female)*

School context. The teachers emphasized the importance of a properly constructed curriculum that adhered to educational benchmarks while also accommodating students' different needs. They expressed the need for administrative assistance, which included open communication lines, judicious resource allocation, and proactive leadership capable of resolving issues quickly to establish a conducive learning environment, and how this affected their emotions. They also valued opportunities for professional development to improve their instructional skills and emphasized the need for ongoing training, workshops, and conferences to support their continued growth and evolution as educators. As another important factor affecting their emotions, they referred to the significance of positive family involvement and engagement in the educational process, adding that they valued constructive feedback from parents on the school and classroom environment. They advocated for open lines of communication so that any issues or challenges could be addressed properly. Lastly, they emphasized the importance of peer connections in building a pleasant workplace environment. Collaborative interactions with colleagues not only provided emotional support, but also allowed for the exchange of ideas, resources, and instructional techniques, which improved instructional effectiveness. Some of the statements regarding this category can be seen as follows:

> *"Professional development opportunities are crucial for improving our instructional skills and keeping current with best practices in education. If the school where we work can create opportunities for continuous training and workshops, it not only helps us grow as educators but also improves our general job satisfaction and emotions." (T6, 30, Female)*

> *"School-home communication and parents' involvement influence teachers' emotions and motivation badly. For example, when parents exhibit rude or confrontational behavior, it causes friction and weakens the sense of partnership between home and school. It was one of the challenges that I faced in the first years of my teaching career." (T5, 28, Female)*

Classroom context. Teachers underlined the joy of watching students' learning progress, as well as the frustration of confronting frequent mistakes and the necessity for additional instruction. Teachers were satisfied when students actively participated in learning activities, but they were also challenged by managing a wide range of student behaviors, including instances of rule disobedience. In short, they emphasized the importance of having a structured yet supportive environment while swiftly addressing behavioral issues to maintain a conducive learning environment. Some of the participating teachers expressed their opinions as follows:

> *"As a teacher, witnessing my students' progress brings me immense joy and pride. When I see them overcome struggles, I'm filled with contentment and satisfaction. However, dealing with misbehavior or learning problems can sometimes be challenging and frustrating. That's why creating a structured, yet supportive environment is essential for managing diverse student behaviors and maintaining a positive learning atmosphere in the classroom." (T7, 23, Female)*

> *"It's discouraging to see the same mistakes being repeated despite my continuous warnings and guidance. It not only disturbs the class flow, but also makes me feel frustrated and angry. Addressing these recurring problems takes patience and persistence, but it is critical to guaranteeing all students' growth and success." (T1, 32, Female)*

Individual factors

In this theme, characteristics, capabilities, and dispositions emerged as a category.

Characteristics. In the first category, teachers stated that their emotions were influenced by a range of personal characteristics they possessed. They pointed out that their levels of calmness, enthusiasm, and cheerfulness had a direct impact on their emotional state and job satisfaction. In contrast, they referred to anxiousness as a characteristic that had a negative impact on their overall emotional state. They referred to friendliness and conscientiousness as characteristics that helped to develop healthy relationships with students and colleagues, which also improved their emotional experiences. Additionally, they stated that ambitiousness influenced their emotional resilience and motivation, affecting their total job satisfaction. Below are some statements related to the characteristics category:

> *"For me, being friendly and conscientious is essential for developing strong relationships with my students and colleagues. These attributes help to create a healthier emotional experience in the workplace. Furthermore, I've discovered that being ambitious increases my motivation and resilience, which improves my job satisfaction. Of course, this can change from person to person."*

> *"In my 10 years' of teaching experience, I can tell that maintaining a sense of calmness in difficult situations typically results in better outcomes. When I approach problems with a calm and cool demeanor, I find that I can think more clearly and make better decisions. Keeping calm not only allows me to manage hurdles more successfully, but it also fosters a positive environment in the classroom." (T3, 32, Female)*

Capabilities. The teachers associated their emotions with their perceived talents in the classroom and workplace. They gave examples of some capabilities, such as a strong sense of self-efficacy, resilience, or problem-solving ability, to be able to better navigate challenges, especially when they were surrounded by problems at the workplace. They emphasized the importance of effective coping skills and self-assurance to maintain emotional resilience and confidence in their talents. Furthermore, they pointed out that autonomy in decision-making and task management gave them a sense of control over their working environment, which improved their emotions and general well-being. The opinions of some teachers can be exemplified as follows:

> *"From my experience, how I feel in the classroom is largely related to my confidence in my talents. When I am confident in my abilities to efficiently manage obstacles, I am more prepared to deal with difficult situations, even when confronted with several hurdles at work. Having autonomy in decision-making provides me with a sense of ownership and control over my teaching environment, which improves my emotions and general job satisfaction." (T6, 30, Female)*

> *"I've realized that my emotions in class seem to reflect my confidence and perseverance. When I feel capable and empowered to tackle difficulties, I can handle obstacles more easily, even when the workload is heavy. Controlling decisions and tasks allows me to maintain a sense of balance and well-being in my educational environment." (T8, 42, Female)*

Dispositions. As an important individual factor, teachers' underlying dispositions had a considerable impact on their emotions. According to them, their cognition, beliefs, and motivation all influenced how they interpreted situations in their professional life and navigated their emotional responses. Furthermore, they emphasized that their personal goals and commitment to the profession strongly influenced their emotions. Below are some statements related to the dispositions category:

> *"Beliefs about teaching have a significant impact on how we approach problems and disappointments in the classroom. For example, if we trust in each student's potential, we face challenges with hope*

and resolve. However, if our beliefs are restricting, we may have difficulty maintaining emotional resilience. It is critical to continually reflect on and examine our beliefs to ensure that they are consistent with our educational goals and values." (T4, 40, Female)

"Motivation serves as the fuel that empowers us to overcome our negative emotions and challenges in the classroom. When our passion for teaching and dedication to our students are strong enough, we can find the strength and resilience to navigate any difficulties that come our way. With unwavering motivation, we can transform obstacles into opportunities for growth and continue to strive for excellence in our profession." (T3, 37, Female)

Discussion

The quantitative part of this study explored the relation between the emotional experiences of elementary teachers, encompassing both negative and positive emotions, and their self-regulation. Surprisingly, negative emotions such as anger, fatigue/exhaustion, and hopelessness were revealed to be devoid of any significant relationship with teacher self-regulation. However, Kelchtermans (2011) proposes that negative emotions predominantly arise from circumstances and outcomes outside of teachers' control, mostly students' misbehaviors (Chang, 2013). Educators commonly experience a range of adverse emotions when interacting with students, such as anger, frustration, hopelessness, and exhaustion. Anger typically stems from situations like student misbehavior or rudeness (Hagenauer et al., 2015), while hopelessness often arises from factors like students' lack of motivation or challenging life circumstances beyond the teacher's influence (Burić et al., 2018). Teacher self-regulation epitomizes the control that teachers exert over the teaching-learning process. Self-regulated teachers manage their learning and teaching through activities such as setting goals, devising strategic plans, monitoring and overseeing their teaching methods, engaging in reflection, and fostering self-motivation for the teaching process (Chatzistamatiou et al., 2014). Therefore, the lack of association between teacher self-regulation and negative emotions may be related to the control factor.

The findings from the study shed light on a significant positive correlation existing between two positive emotions commonly experienced by teachers – Pride and Love – and their ability to regulate themselves effectively. Teachers demonstrate their commitment to enhancing the teaching process through self-regulated instruction, thereby fostering conducive learning environments. As Pawłowska (2020) mentions, the success of others, whom individuals believe they have influenced, generates pride in the individual. The success of students, perceived by teachers within their sphere of influence, also instills pride. As educators observe students' accomplishments stemming from their efforts, they manifest a sense of pride. Burić et al. (2018) note that pride is intricately linked with individual achievement and development, particularly evident in academic excellence, often underscored by the recognition of the teacher's contribution to student progress. Consequently, the impact of teachers' self-regulation on pride becomes evident, highlighting the significant efforts educators invest in their instructional practices, which in turn evoke feelings of pride. In addition to pride, the study's findings also highlighted a significant correlation between teachers' self-regulation and love. The research by Li and Rawal (2018) demonstrates the relationship between love and teachers' deep passion for their profession, their determination to maintain it despite challenges, and their proactive efforts to understand their students' potential and strategize their teaching, even under unfavorable conditions. Thus, a clear connection between love and effective teaching is evident.

Interestingly, the connection between self-regulation and joy, which is one of the emotions commonly reported by teachers in several studies (e.g. Frenzel & Gotz, 2007; Keller et al., 2014; Sutton, 2000), has not been identified. This result is consistent with the findings of Chatzistamatiou et al. (2014), who also concluded that teachers' enjoyment of teaching was not significantly linked to their reported use of self-regulatory teaching strategies. Research into teacher emotions suggests that the primary source of joy for educators often lies in the relationships they cultivate with their students (Hagenauer et al., 2015) and in maintaining effective classroom discipline (Frenzel et al., 2009). Given that joy is predominantly linked to interpersonal connections, it could be speculated that it may not be directly associated with teachers' self-regulated teaching skills. This implies that while joy is an integral aspect of the teaching experience, its relationship with self-regulation in teaching practices may be mediated by various factors related to interpersonal dynamics and classroom management.

Although the findings of the research have identified relationships between teacher self-regulation and positive emotions such as pride and love, examining the coefficients reveals that these relationships are not highly significant. Therefore, the inference drawn is that emotions may be influenced by factors beyond the teacher's self-regulation in teaching. In this regard, focus group studies were conducted in the second part of the research to uncover what these influences could be. The qualitative findings of the study shed light on the predominant focus on the impact of external factors. Teachers notably underscored the importance of various variables arising from their work conditions, including factors such as their working hours, salaries, and workload. Additionally, they emphasized the significance of elements within the school context, such as peer relationships, parental feedback, and the curriculum, in shaping their emotional experiences. Furthermore, teachers highlighted the crucial role of

classroom dynamics, such as students' progress and behavior, in influencing the development of both positive and negative emotions. In essence, they tended to attribute their emotional responses more to external circumstances rather than their teaching skills. The sole aspect they highlighted regarding teaching skills was the lack of sufficient professional development opportunities to enhance these skills. These findings are consistent with those of Chen (2019), who observed that teachers often experienced intense negative emotions related to rigid promotion policies, idealistic educational reforms, and unfair public criticism at the macro-system level, as well as unrealistic parental expectations and unhealthy competition among colleagues at the meso-system level. Similarly, Likewise, Bahia et al. (2013) discovered that most negative emotions reported were by the teachers associated with the ongoing political reform, while positive emotions were linked to interactions within the classroom. In sum, they indicated that all these contextual factors being negative led to negative emotions in teachers while being positive led to positive emotions.

Although not receiving as much emphasis as external factors, teachers also saw a connection between their emotions and personal characteristics. They highlighted beliefs such as self-confidence in managing their emotions, assurance in their teaching abilities, and their preferred approaches to teaching. In this context, teachers appeared to prioritize their beliefs and attitudes over solely focusing on their practical teaching skills. This suggests that teachers view their emotional experiences as intertwined with their broader self-perceptions and professional philosophies. This further validates the findings of Burić and Macuka's (2018) study, which examined how teachers' negative and positive emotions are affected by their self-efficacy and motivation, particularly in terms of work engagement. Similarly, Chen (2020) also established a connection between teachers' teaching approaches and their emotional experiences.

Conclusion and Implications for Future Research

In sum, the findings from the focus group interview seem to explain why we did not find significant relationships between teacher self-regulation and teacher emotions. Emotions seem to be unrelated to teaching skills. Instead, the teachers attribute the source of their emotions mostly to external factors and individual characteristics to some extent. It is widely acknowledged that effective teacher self-regulation contributes to fostering effective teaching experiences. This notion suggests that teachers who are adept at self-regulating their actions and behaviors are more likely to create effective learning experiences that may evoke a spectrum of emotions in teachers. Despite these expectations, the observed correlations between teacher self-regulation and emotional experiences have been relatively weak. Consequently, it becomes challenging to definitively assert the presence of a direct relationship between these two constructs. It is plausible that there may be other variables at play, acting as a moderator in this relationship. Hence, it becomes imperative for future research endeavors to delve deeper into this aspect. By conducting more extensive investigations, researchers can explore and identify potential moderating variables that might elucidate the complex interplay between teacher self-regulation and emotional experiences.

Another reason for the lack of relationship between these two constructs could be related to the measurement approach of teacher self-regulation. Since self-regulated teaching skills were assessed through self-report, they were measured based on teachers' perceptions of their practices, which may not fully reflect their actual teaching activities in the classroom. Future researchers should consider employing multiple measurement approaches, including objective measures and qualitative methods, alongside longitudinal designs and contextual considerations, to better understand the relationship between teacher emotion and self-regulation, as the lack of correlation found in this study may be attributed to the reliance on self-report measures alone, which might not fully capture the complexities of teacher practices in the classroom.

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The Effectiveness and Relationship of Student Responses toward Learning Outcomes Using Interactive Multimedia-Based E-Modules in Elementary Schools

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Abstract

An interactive multimedia-based e-module is an enhanced version of conventional modules incorporating information technology. It integrates navigation buttons and user instructions, enabling independent use by those at any location and time. This phenomenon facilitates the optimal implementation of learning in the digital literacy era. This study employed a quantitative design utilizing the pre-experimental design research method. It specifically utilized a one-shot case study research form to examine the effectiveness of learning. Additionally, it employed the correlation analysis method to investigate the relationship between student responses and learning outcomes. This effort is achieved by utilizing interactive multimedia-based e-modules focused on the topic of building space in elementary school. A total of 24 fifth-grade students were included as research subjects. Moreover, the employed instruments consisted of tests of learning outcomes and questionnaires. The research data were evaluated using descriptive statistics, the N-Gain, and the correlation test. The findings indicated that using interactive multimedia-based e-modules for teaching space-related content yielded significant positive effects on learning outcomes. The research data were analyzed using descriptive statistics, N-Gain, and correlation tests. The findings revealed that: 1) the utilization of interactive multimedia-based E-Modules for teaching space-related content is quite effective, resulting in significant improvements in learning outcomes falling within the medium category; and 2) there exists a strong and close relationship between student responses to the implementation of interactive multimedia-based E-Modules and their learning outcomes in mathematics learning at the elementary school level.

Keywords:

E-modul, Interactive Multimedia, Digital Literacy in Schools

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Introduction

Mathematics plays a crucial role in the advancement of science and technology, making it imperative for students in both primary and secondary schools to study it. The objective of studying mathematics in Indonesian schools is to foster logical, analytical, systematic, critical, and creative thinking skills (Torar & Wahono, 2016). Furthermore, another goal is to improve students' understanding of mathematical concepts. Unfortunately, a significant portion of the population still has negative opinions or attitudes regarding this particular subject (Gafoor & Kurukkan, 2015; Raj Acharya, 2017). Mathematics is consistently identified as the topic that presents the most challenges for learning, according to many studies (Brown & Quinn, 2006; ,etin, 2018; Mutlu, 2019; Schwartz et al., 2018).The challenge lies in the students' comprehension and application of mathematical principles (Rohmah et al., 2022). The active participation of students is crucial in the learning process to enhance their comprehension of the teacher's instruction (Astuti et al., 2021; Sutarto et al., 2020).

Given the prevalence of technology in today's society, teachers must possess the necessary skills to utilize digital technology effectively to promote children's learning and facilitate their development (Shvardak et al., 2024). No wonder teachers deserve to be introduced and taught about the use of technology. Technological progress has made many changes such as innovation-innovation and creativity by teachers by using technology as a medium of interaction between teachers and students that then materializes in digital access. Digital literacy is expected to be the motivation of teachers in order to be technologically intelligent. Digital literacy is the attitude and skills of a person to obtain, create, solve, and convey information to students using advanced digital technology. One of the learning media with the use of digital literacy is using an interactive multimedia-based E-Module.

An electronic module, also known as an e-module, is a computer-based learning tool that incorporates text, images, graphics, music, animation, and video to facilitate the learning process (Nugraha et al., 2015). This e-module is compatible with both computers and smartphones, allowing for flexible learning opportunities anywhere and at any time. It may be utilized in various settings, such as in schools or for reviewing and reinforcing material at home. Utilizing interactive multimedia-based E-modules enhances the learning experience by fostering innovation and interactivity, thus promoting active student engagement in the learning process (Evans & Gibbons, 2007; Vrtačnik et al., 2000). The integration of text, images, audio, music, animated visuals, or videos in units facilitates the attainment of learning objectives by mutually reinforcing each other (Leow & Neo, 2014).Therefore, it has the ability to alter students' perspectives on challenging learning materials, resulting in increased happiness and motivation to learn (Ampa, 2015).

Student learning outcomes remain low due to the teacher's continued reliance on the lecture method, where students passively perceive information and then complete assigned questions. Teachers have traditionally utilized learning modules, but they have not yet included electronic or modern methods. This approach renders the learners passive and tedious. Hence, it is imperative to modify or diversify the learning module by including technology, multimedia, and interactive elements to enhance the learning experience. One method is to use e-modules that are based on interactive multimedia. Interactive multimedia-based e-modules can cater to the requirements of students with varied learning styles, as they incorporate animation and other engaging displays that stimulate student interest and motivation. This, in turn, fosters a more authentic learning environment and enhances the effectiveness of the learning process (Iasha et al., 2018). Increasing interest in studying can lead to better learning outcomes. One of the requirements for interactive multimedia-based e-modules is self-instruction, which allows students to study the educational materials independently. The purpose of teaching students to be independent is to instill in them the responsibility to self-organize and self-discipline, as well as develop their own learning skills. This includes actively engaging with visual stimuli, such as images and varying forms of written content that incorporate color, movement, animation, and video. Additionally, students should be able to provide responses and feedback on the content, such as through exercises, evaluations, or quizzes (Sidiq et al., 2019).

Previous research has revealed that E-modules are very effective in helping students learn (ISTUNINGSIH et al., 2018; Ningsih & Mahyuddin, 2021) and creating a pleasant atmosphere when learning.(Lumbantobing et al., 2019; Santi & Sholeh, 2020) and can help improve the quality of learning for elementary school students (Mcgill & Bax, 2005) research by (Satriawan, 2020) stated that the ability of other students that can be enhanced through interactive multimedia is the ability to communicate skills in relation to working together and coordinating in solving problems. Furthermore, the ability to think creatively can be one of the points of interactive multimedia development as elementary school students can explore new solutions of delivering interactive material, which can help train them to think creative.(Firdaus et al., 2020; Nada & Araœjo, 2018).

In order to optimize effectiveness in helping elementary school students resolve learning material-related problems (Sudipa et al., 2022). it is imperative to employ appealing concepts that incorporate a blend of visuals, animations, and auditory elements.

This approach facilitates comprehension, motivates students, and enhances their grasp of the subject matter. Furthermore, enhancing efficacy can be achieved by incorporating evaluation features or tasks to engage students' cognition following their exposure to the instructional material, as supported by the research conducted by (Vandri & Usmeldi, 2020). This study underscores the importance of features that provide feedback, as they help students understand their chosen solutions and reinforce their understanding of the problem at hand.

An important factor that can determine student success in learning, one of which is student response. Student response is an essential factor that can determine a student's academic success. A response can be defined as a behavioral change that is induced by an environmental stimulus (Salsabila et al., 2023). The learning process will be hampered if the student's response to learning is still lacking. Students' interest in the teaching materials and learning media presented will make their attention focus on learning activities, and students will not get bored quickly(Midroro et al., 2021). Furthermore, through mathematical experiences in elementary education, students can develop positive attitudes toward the subject and perceive it as both entertaining and practical. Students' motivation to learn mathematics is significantly correlated with their attitudes, according to (Herges et al., 2017; Pambudi et al., 2020). Alternatively, individuals with a negative attitude are less motivated to study mathematics than those with a positive attitude (Pambudi et al., 2020; Singh et al., 2002). The positive attitude that students have toward learning mathematics through interactive multimedia-based e-modules will have an impact on student learning outcomes.

Therefore, the interactive multimedia-based E-module is designed to facilitate students' comprehension of the subject matter and allow them to engage in the learning process. This study aims to describe student responses, the effectiveness of elementary school students on the development of interactive multimedia-based E-Modules, and the relationship between student responses and student learning outcomes in using interactive multimedia-based E-Modules'

Interactive multimedia-based e-modules are designed to offer students a hands-on learning experience, enabling them to independently engage in the learning process andenhance their comprehension of the materials. As a result, this study attempted to describe student effectiveness and the relationship between their responses to learning outcomes while utilizing interactive multimedia-based e-modules for learning mathematics in elementary schools.

Theories And Concepts Used In The Study

E-modul

Modules are a form of learning material that is now being developed to meet the integration of learning outcomes competencies and to facilitate the availability of learning materials that can be accessed independently and direct learning with various sources (Johan et al., 2022). Meanwhile, electronic modules are teaching materials that can help students learn subject matter independently using electronic media. Since electronic modules can help students learn individually/ independently in the classroom, the teacher is only a facilitator (Persepsi & Motivasi, 2019).Electronic modules can display text, images, animations, and videos through computers, and e-modules can improve students' understanding of concepts and learning outcomes (Suyatna et al., 2018).

Digital modules are inherently beneficial because they can deliver certain content through interactive learning media. There are nine characteristics of e-modules. Firstly, users can operate it autonomously (self-instructional). Secondly, the module's content is comprehensive, functioning as a self-contained unit. Thirdly, the module operates independently of any additional media. Fourthly, the module is adaptable to technological and scientific advancements. Fifth, the module is intuitive to operate (user-friendly). Sixth, the module layout is uniform in all aspects (margins, spaces, typefaces). Seventh, the module is compatible with electronic devices, including computers and mobile phones. Eighth, as a multimedia module, it can incorporate various additional electronic media. Finally, the module is meticulously designed and uses software application features (Gufran).

Interactive Multimedia

Interactive multimedia encompasses a variety of media components—text, images, animated graphics, audio, and video—which can be controlled and operated by the user. Users can determine which elements they want to display by utilizing the available options and instructions (Bardi & Jailani, 2015). Interactive multimedia offers a multitude of benefits. To begin with, the integration of interactive multimedia enhances the level of innovation and interactivity in the learning process. Interactivity in multimedia facilitates learning by enhancing comprehension of the presented material. Students are actively involved in the learning process evan(Evans & Gibbons, 2007; Vrtačnik et al., 2000), Secondly, interactive multimedia enables the integration of various components, such as text, images, audio, music, animated images, and videos, into a single unit that supports each other to achieve learning objectives (Leow & Neo, 2014).

Integrating interactive multimedia into the learning process benefits both students and the setting for learning. Focusing on the students makes the learning process more active and interactive, facilitating their comprehension of the material. As a result, the implementation of interactive learning media can potentially enhance student learning outcomes(Iasha et al., 2018)

Digital Literacy in Schools

Digital literacy is also often considered similar to media literacy (Koltay, 2011), as it aims to improve the ability to access, analyze, and evaluate various forms of information and communication. Digital literacy refers to the set of abilities and skills required to effectively utilize the internet and technology (Cartelli, 2010). UNESCO defines digital literacy as the ability to read and comprehend any form of text, including screen-based, written, or aural discourse. Digital literacy covers the ability of an individual to proficiently and effectively operate technological devices for a variety of objectives, including the support of learning objectives by digital literacy schools and, more frequently, as a foundational element of educational practice that prepares students to thrive in a digital society (Leaning, 2019). Enhancing students' early engagement with digital media is the primary objective of digital literacy education, fostering their development into proactive, inventive, productive, and creative individuals.

Method

The study population consisted of all students enrolled in SD Negeri 13 Surau Gadang, Padang City, West Sumatra Province, for the second semester of the 2022 academic year. The research sample comprised 24 fifth-grade students, evenly divided between 12 girls and 12 boys.

This study is quantitative research using a one-shot case study design. It involved a treatment group and aimed to analyze the correlation between two or more variables. Specifically, it examined the relationship between changes in one variable and changes in other variables (Suyitno et al., 2019)

The study used tests and questionnaires as instruments. The test instrument was utilized to gather data on student learning outcomes acquired through the utilization of interactive multimedia-based e-modules in elementary schools. Data collection was conducted using both the pretest and posttest. Additionally, the questionnaire was employed to assess the students' feedback regarding the implementation of interactive multimedia-based e-modules.

Descriptive and N-Gain analyses were performed on the data using the following formula (Utomo et al., 2020)

$$N - Gain = \frac{Posttest\ Score - Pretest\ Score}{Maximum\ Score - Pretest\ Score}$$

The results of the N-Gain data analysis were categorized according to the (Hake, 1998) category listed in Table 1

Table 1:
N-Gain Score Category

Gain Score	Category
G < 30	Low
0.3 ² G ² 0.7	Middle
G > 0.7	High

To measure effectiveness, the categories used are based on Table 2.

Table 2.
The Effectiveness of N-Gain Score (Aeni et al., 2019)

Gain Score (%)	Category
< 40	Ineffective
40 - 55	Less Effective
56 – 75	Quite Effective
>75	Effective

A questionnaire was employed to find out the students' responses to the interactive multimedia-based e-module. The following formula can be used to calculate the percentage of student responses:

$$Score\ Criteria = \frac{Total\ Score}{Total\ Maximum\ Score} x100$$

Respondents determine the response to the statement given with criteria according to Table 3 below ; (Lukitawati, 2014)

Table 3.
Student response categories

Percentage of Teacher and Student Responses	Category
85% ≤ Response Score	Very Positive
70% ≤ Response Score < 85%	Positive
50% ≤ Response Score < 70%	Less Positive
Response Score < 50%	Not Positive

The final step involves examining the relationship between student responses and learning outcomes when using interactive multimedia-based e-modules for studying building space. It is done by calculating the correlation coefficient between the student response variables (X) and the learning outcomes (Y) obtained from the use of interactive multimedia-based e-modules. Correlation coefficients can be obtained using SPSS version 15.

Results

The validity of interactive multimedia-based e-modules has been assessed by two validators who are experts in their respective fields of study. The material was verified by a lecturer specializing in Primary School Teacher Education at Bung Hatta University, while the design and appearance were verified by a lecturer specializing in Informatics and Computer Engineering Education at Bung Hatta University. The analysis of the interactive multimedia-based e-module on grade five elementary school building space material, conducted by material experts and design experts, yielded highly valid results with a percentage of 89.51%. This result indicates that interactive multimedia-based mathematics learning e-modules can effectively serve as a medium for teaching mathematics in elementary schools.

Based on this basis, it is possible to investigate the responses of students and the effectiveness of learning outcomes derived from interactive multimedia-based e-modules, as well as the correlation between student responses and student learning outcomes, in the way described below:

The effectiveness of interactive multimedia-based e-modules

Based on this basis, it is possible to investigate the responses of students and the effectiveness of learning outcomes derived from interactive multimedia-based e-modules, as well as the correlation between student responses and student learning outcomes, in the way described below:

Figure 1.
Respondents' Posttest and Pretest Graph

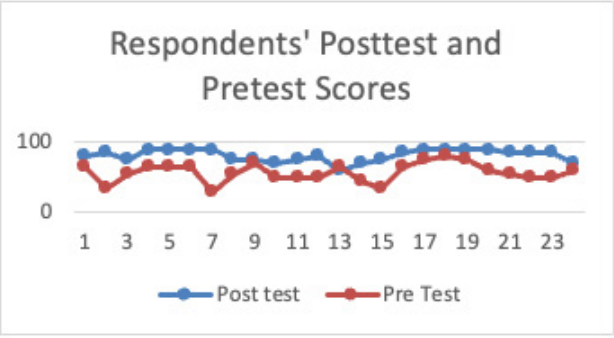


Figure 1 visually demonstrates that respondents' pre-test and post-test scores generally do not overlap. There exists a disparity between the pre-test and post-test scores of the respondents. However, it is necessary to conduct statistical testing using a paired t-test to see if there is a significant disparity between the participants'pre-test and post-test scores. Furthermore, alongside the graph depicted in Figure 1, one can examine the descriptive statistics table below to see if a disparity exists between the pre-test and post-test score data, specifically regarding an increase or decrease in value.

Table 4.
Descriptive statistics of pretest and posttest data
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	57,08	24	12,931	2,640
	Postest	81,25	24	8,629	1,761

Table 4 displays the descriptive statistics of the data collected before and after the test. Table 4 shows that the pretest value has an average (mean) of 57.08, while the posttest value has an average of 81.25. The difference in value between pretest and posttest scores demonstrates a disparity in the mean value of participants. In short, applying an e-module utilizing interactive multimedia in studying building space material leads to a noticeable increase in participants' knowledge. Nevertheless, it is imperative to do a paired t-test for statistical validation. In order to draw meaningful results in parametric testing using a paired t-test, it is necessary for the data being analyzed to have a normal distribution. Hence, it is imperative to initially examine the data distribution of the respondents' pre-test and post-test scores. Below are the results of testing the respondents' pretest and posttest data distribution.

The results of testing the distribution of respondents' pretest and posttest data using the Kolmogorov-Smirnov and Shapiro-Wilk test statistics are presented in Table 5. The test results indicate that the p-values of both the Kolmogorov-Smirnov and Shapiro-Wilk tests on the pretest and posttest data are more than (>) 0.05, confirming that the normality assumption is met.

Once the validity of the pretest and posttest scores is established, the effectiveness of using interactive multimedia-based e-modules to enhance student learning outcomes in space material can be assessed. The effectiveness of this approach is measured through the N-Gain Score, which is presented in the table below:

Table 5.
N-Gain Score Effectiveness Results

Description	Total number of students	Total Score	Average	N-gain	Category
Pre-test	24	1370	57.08	0.51	Quite Effective
Post-test	24	1950	81.25		

Table 5 demonstrates that the utilization of interactive multimedia-based e-modules has resulted in an improvement in student learning outcomes. The pretest score totaled 1370, while the posttest score grew to 1950, with the participation of 24 students. The review results indicate that the N-Gain value is 0.51 (51%), placing it in the fairly effective category. Therefore, it can be inferred that the utilization of

interactive multimedia-based e-modules for teaching building space content is highly effective in enhancing the learning outcomes of fifth grade students, resulting in an average improvement of 69.17.

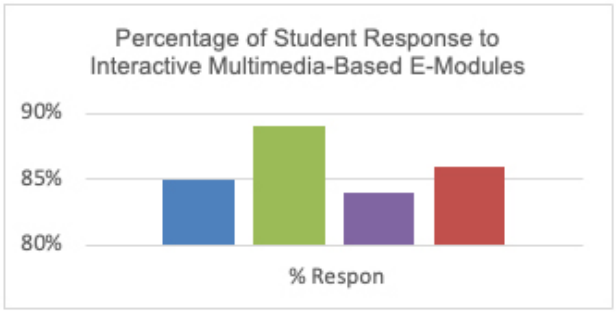
Students' response to the interactive Multimedia-Based E-Module

Twenty-four students filled out student response questionnaires. The student response questionnaire was filled out after the class teacher delivered the learning process using interactive multimedia-based e-modules on the material "building space" in grade 5 of elementary school. The following are the results of analyzing student responses to learning using interactive multimedia-based e-modules

Table 6.
Percentage of Student Response Questionnaire to Interactive Multimedia-Based E-Modules

No.	Assessment Aspect	Total	Practicality Score (%)	Criteria
1	Student Interest	422	84%	Positive
2	Module Usage Process	172	86%	Very Positive
3	Increase in Student Creativity	174	87%	Very Positive
4	Evaluation	248	83%	Positive
Average Practicality of E-Modules			85%	Very Positive

The percentage of student responses to interactive multimedia-based e-modules in elementary schools can be presented in the form of a bar chart as follows:



Ket:
-Student Interest
-The Increase of Student Creativity
-Evaluation
-Module Usage Process

According to the above analysis, 84% of respondents believed that the use of e-modules in learning could increase student interest, which is considered very positive. Additionally, 86% of respondents stated that the process of using e-modules was enjoyable for students, simple to comprehend, and user-friendly, which is also considered very positive. The use of e-modules, according to 87% of respondents, enhanced student creativity. Finally, 83% of respondents believed that the use of e-modules assisted students in assessing their understanding of the material being studied. As stated previously, the average percentage of responses from students regarding the utilization of interactive multimedia-based e-modules for the learning process is 85%, with a very positive category.

Relationship between student response and learning outcomes

Establishing a relationship between student responses and student learning outcomes can be assisted by using SPSS software. To accomplish this, the following hypothesis must be determined in advance:

Ho: There is no relationship between student response and learning outcomes using an interactive multimedia-based e-model.

Ha: There is a relationship between student responses and learning outcomes using an interactive multimedia-based e-model.

Following the analysis results generated by the SPPS software, the following output is obtained:

Correlations

		Respon Siswa	Hasil Belajar Siswa
Respon Siswa	Pearson Correlation	1	,687**
	Sig. (2-tailed)		,000
	N	24	24
Hasil Belajar Siswa	Pearson Correlation	,687**	1
	Sig. (2-tailed)	,000	
	N	24	24

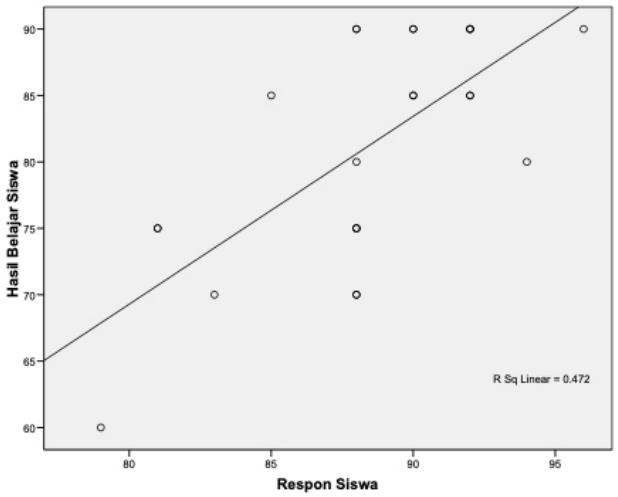
**. Correlation is significant at the 0.01 level (2-tailed).

The analysis above reveals that the correlation result (rxy) is 0.687, denoted by a significance level of 0.000. In addition, the presence of two stars (**) signifies a correlation with a 5% or 0.05 significance level. Because the significance value (0.000) is smaller than α (0.05), Ho is rejected. This is determined by the result of the decision; if Sig. (2-tailed) is less than (<) 0.05, then a correlation exists between the connected variables. Conversely, if the value of Sig. (2-tailed) > 0.05, then there is no correlation between the two variables. Based on the analysis of student responses and learning outcomes pertaining to the utilization of interactive multimedia-based e-modules concerning the subject matter of "building space" in the fifth grade of elementary school, it can be inferred that a relationship exists. Since the correlation result (rxy) is 0.687, the correlation is strong. This is based on the grouping of correlation values below:

Table 7.
Correlation Value Grouping

Value	Correlation
0.00 – 0.20	Closeness correlation is very weak
0.21 – 0.40	Closeness correlation is weak
0.41 – 0.70	Closeness correlation is strong
0.71 – 0.90	Closeness correlation is very strong
0.91 – 0.99	Closeness correlation is extremely strong
1	Closeness correlation is perfect

The above explanation can be shown with a scatter diagram as follows:



It can be concluded that student responses and student learning outcomes have a strong relationship in applying interactive multimedia-based e-modules in elementary schools.

DIscussion

Learning outcomes are measurable indicators that reflect students' level of achievement or performance as a direct consequence of their engagement in the learning process. The assessment of students 'cognitive learning outcomes can be observed through their proficiency in what they have learned. The enhancement of student learning outcomes can be observed through the implementation of pre-test and post-test assessments. The phenomenon of a change in behavior leading to an increase is referred to as effectiveness. In order to assess the effectiveness of interactive multimedia-based e-modules, the pre-test results were examined, which included predetermined indicators. The pre-test findings are intended to ascertain the extent of student comprehension prior to utilizing interactive multimedia-based e-modules. Furthermore, the post-test results following the use of interactive multimedia-based e-modules in the educational procedure exhibit distinct findings. The difference demonstrates a considerable improvement in student learning outcomes before and after implementing e-modules. Administering tests during lessons can enhance the effectiveness of student learning with the aim of enhancing learning outcomes. Tests can be conducted as pre-tests or post-tests, each serving specific purposes to assess the attainment of learning objectives and the effectiveness of learning activities. The research revealed an N-Gain effectiveness result of 0.51 (51%), with the category obtained being quite effective. Hence, the utilization of interactive multimedia-based e-modules is effective in the process of learning.

The increase in students' learning outcomes following the utilization of interactive multimedia-based e-modules demonstrates the significance of focusing on students' cognitive capacities as a crucial component of learning outcomes.

The effectiveness of the e-module is not determined solely by the improvement in student learning outcomes as measured by pre-tests and post-tests. The manner in which students react to their experience with E-Modules provides supporting evidence that interactive multimedia-based E-Modules are highly beneficial for students.

The response can be interpreted as acceptance, rejection, or indifference to what is learned in learning. Based on the findings, 89.8% of students accepted the learning process with interactive multimedia-based e-modules very positively. Students' positive responses will contribute to the improvement of the learning environment. A pleasurable learning environment fosters student comfort and facilitates a more effortless comprehension of the subject matter. As a result, the learning process becomes more meaningful because students learn independently to solve problems and improve their own knowledge.(Lumbantobing et al., 2019)) state that e-modules foster a positive learning environment.

If a teacher can encourage students to engage in his learning approach actively, the relationship between stimulus and response will appear or run effectively. According to Hamalik (2001) in his book "Teaching and Learning Process," the teacher can elicit an effective response from students by giving them a suitable and impactful stimulus. Similarly, if students' responses to the usage of interactive multimedia-based e-modules as a learning tool are favorable, it will positively affect their learning outcomes. Hence, if a correlation exists between these variables, any changes in one of the X variables will lead to corresponding modifications in the other variable (Y). The term is considered a causal term, specifically describing the correlation analysis.

A correlation analysis was performed to determine whether or not a relationship exists between student responses and student learning outcomes. Based on the findings, the significance value (0.000) is smaller than α (0.05), so Ho is rejected. This implies that a relationship exists between the responses of students and the learning outcomes of students when interactive multimedia-based e-modules are utilized. Additionally, the correlation test is conducted, which is a data analysis procedure utilized to ascertain the degree of association between the independent variables (X and Y). The results indicate that the correlation coefficient (rxy) is 0.687, with a significant value of 0.000. With a value of (rxy) = 0.687, the correlation is strong. Therefore, there is a strong correlation between the utilization of

interactive multimedia-based e-modules for building space material in elementary schools and students' responses to learning outcomes.

Alternative e-modules, according to research by (Ricu Sidiq & Najuah, 2020), can generate, stimulate, and strengthen interest in independent learning, resulting in a more effective and efficient learning process and an overall improvement in learning quality. E-modules based on interactive multimedia have the potential to accommodate students with varying learning styles, cultivate a more authentic learning environment, incorporate visually appealing animations or displays to pique students' interest, and ultimately enhance student learning outcomes. Therefore, the implementation of digital learning media can impact learning in various manners, including fostering students' motivation to learn, enabling them to surmount temporal and spatial constraints, furnishing more lucid information, and diminishing superfluous expenditures associated with producing learning materials (Vebrianto & Osman, 2011).

Conclusion

Based on the discussion, it can be concluded that:

1.The application of learning by utilizing interactive multimedia-based e-modules is quite effective in improving elementary school students' learning outcomes on the building space material. The increase in learning outcomes amounted to 24.17, with an N-Gain value of 0.51 (51%) in the medium category.

2.Interactive multimedia-based e-modules developed and tested in this study received a very positive response from students, at 85%.

3.There is a relationship between student responses and learning outcomes when utilizing interactive multimedia-based e-modules in learning, with calculations obtaining a significance value (0.000) smaller than α (0.05), so the null hypothesis is rejected. Furthermore, it is obtained that the correlation value (rxy) is 0.687, so the correlation is strong. Thus, student responses and learning outcomes towards the use of interactive multimedia-based e-modules have a strong relationship.

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Fostering Students' L2 Writing Skills and Intercultural Awareness Through Digital Storytelling In Elementary Education

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Abstract

This paper presents a study conducted in a Greek Elementary school and explores the impact of Digital Storytelling (DST) on developing children's second language (L2) writing skills and their intercultural awareness. The development of digital technologies has enabled the use of different multimedia tools to reconfigure traditional storytelling. The researchers' aim was to reinforce a learner-centered approach to the teaching of writing by provoking influence in innovation of pedagogical practices that personalize learning. L2 learners of diverse cultural backgrounds attending the fifth grade (n=21) of a Greek state elementary school, were involved in composing, sharing and reflecting upon stories from their own cultural backgrounds. The researchers built an interculturally-oriented language framework for better addressing young learners' literacies, ensuring they work in a stimulating environment, spending time online and engaging with digital applications. Qualitative and quantitative mix methods were used to estimate the feasibility of the intervention, including a pre- and post-test, teachers' journals and focus group discussions with the L2 learners. Variables of the study were fifth graders in the context of an elementary school in Greece (independent variable) and their writing skills in Greek as a second language (dependent variable). Data processing, by means of a pre- and post-test, revealed that the DST approach provided students with opportunities to acquire improved communicative competence through writing creatively. Journal data indicated that DST application in a game-based context enhanced task engagement, encouraging young learners to use interactive media in a digital environment. Young learners' intercultural competence development was also shown to be supported through the DST approach. In the focus group discussions, participants stated their interest and satisfaction in the approach and the methods applied. All in all, the results imply that the approach implemented has the potential to be used as a meaningful technology integration approach as far as language teaching and learning is concerned. The findings additionally explore pedagogical implications for future teaching practices in order to enhance and extend the approach and methods employed.

Keywords:

Digital Storytelling, 21st Century Skills, Second Language Learning, Multicultural Context, Young Learners.

Introduction

Striding forward into the digital era, policy makers aim at designing curricula offering opportunities for meaningful technology integration into teaching and learning at the primary level. Communication, collaboration, creativity and critical thinking are fundamental 21st century competencies for learners' future success (Fayer, Lacey & Watson 2017). Robin (2008) states the benefits of creating one's own digital stories, claiming that learners are able to develop various types of literacy, such as digital and information literacy by finding, evaluating, and synthesizing information, while communicating with a community and discussing issues of interest (Robin, 2008, p.224).

The relevance of a digital agenda is acknowledged by the European educational policy, highlighting the importance of integrating technology meaningfully and effectively into teaching and learning at the primary level. Research attests to the positive student engagement brought about by the inclusion of digital technologies across all grade levels (Scott, 2015), encouraging all stakeholders to employ relevant future classroom scenarios. In this light, transforming the language learning classroom means seizing opportunities to equip children with the skills necessary for educational technology use, focusing on creativity, critical thinking and citizenship-related aspects

Responding to 21st century challenges: Digital Storytelling as an effective instructional tool

The rapid increase of the digital media has resulted in the emergence of new pedagogies in language teaching, with researchers examining their potential by providing learners with opportunities to adopt new technologies while learning (McNeil, 2020). Digital storytelling (DST) constitutes a useful tool to the acquisition of the 21st century competencies, enabling the story creator to tell a story in more than one language: verbal, visual, audio etc. (Center for Digital Storytelling, 2010).

The DST process creates a context of multiliteracy in the language learning classroom (Cope & Kalantzis, 2000). Multiliteracies refer to the ability to identify, interpret, create, and communicate meaning across a variety of visual and oral forms of communication, involving an awareness of the social, economic and wider cultural factors that frame communication. Multiliteracies seem to allow young learners to acquire language skills, to develop their collaboration and problem-solving skills, as well as to interact with digital media (Korosidou, 2024; Korosidou et al, 2021; Yang & Wu, 2012). Furthermore, metacognitive skills and critical thinking are enhanced through multilingual DST (Anderson et al, 2018).

DST can serve as a potent tool for students, as they can become story-creators and story-tellers, by researching certain topics and combining a variety of digital elements within a narrative structure. The 'Seven Elements of Digital Storytelling' (Robin, 2013) constitute the building blocks of DST, facilitating the digital story creator to address key issues in making the DST process effective. Aspects such as the author's point of view, raising a dramatic question, the power of the narrator's voice and that of an effective soundtrack, as well as economy and pacing are recorded in the relevant literature (Robin, 2013). It is observed that students taught using DST can outperform the ones taught through Information and Communications Technology-integrated instruction in the areas of content knowledge, critical thinking and learning motivation (Yang & Wu, 2012). The rich multimedia learning environment allows for the dynamic and interactive process of creating, publishing and sharing digital stories to take place (Yang & Wu, 2012).

Modern multicultural classrooms can serve as an "entryway" into interaction among different cultures and experiences, enabling students to participate in educationally purposeful activities in order to develop citizenship awareness and intercultural competence (Griva & Korosidou, 2024). Intercultural competence, which is one of the eight core skills in lifelong learning proposed by the European Commission (2018), incorporates the ability to develop targeted knowledge, skills and attitudes that lead to visible behavior and communication, both being effective and appropriate in intercultural interactions (Council of Europe, 2001). The Council of Europe (2016) also defined the goals of intercultural education, focusing on the development of open, reflective and critical attitudes, so that it is possible to adopt positive views and reap the benefits that arise from contact with all forms of diversity (Council of Europe, 2016, p, 12).

DST can also be applied as an effective means of enhancing diversity awareness and intercultural competencies. 'Intercultural skills and know-how' include the ability to bring the culture of origin and the foreign culture into relation with each other; the ability to identify and use a variety of strategies for contact with those from other cultures; the capacity to fulfill the role of cultural intermediary between one's own culture and the foreign culture and to deal effectively with intercultural misunderstanding and conflict situations. (Council of Europe, 2001, pp.103-104). Cummins and Early (2011) assert that the DST process can provide space for students to explore, make meaning and represent their multilingual selves by producing identity texts which foster intercultural and interlingual literacies. What is more, creating one's own digital story seems to help students present their ideas, knowledge or experiences to their audience following an individual frame and in a way which is primarily

meaningful to them. They can consider on their own reflection process regarding intercultural differences and communicating across cultures (Ribeiro, 2016). Benmayor (2008) sees the process as transformative, also facilitating self-awareness and empowerment, stating that 'Digital storytelling is an assets-based pedagogy where students can bring their own cultural knowledge and experience to the fore ... to transform their thinking and empower themselves' (p.200). Digital narration is observed to produce a safe foundation for intercultural cooperation which empowers learning (Fokides, 2016). In the same vein, Cummins and Early (2011, p. 3) state that when engaging learners in creating digital stories that demand identity investment, opportunities are provided to express their intercultural life experience, including their linguistic repertoires, and the construction of multiple and fluid identity positions and "holds a mirror up to students in which their identities are reflected back in a positive light".

Materials and methods

Aim and research questions

The ultimate aim of the present study was to nurture a more collaborative and creative approach to literacy by means of a pilot program implementation. In light of the above, researchers aimed at facilitating L2 writing skills and enriching the existing material for leaning Greek as a second language. Therefore, they introduced and applied the pedagogical framework of the 'VOICES' project (see Design of the program below). Digital narratives' composition was put at the core of the 'VOICES' project as a basic means for developing intercultural competence. Concepts relating to critical understanding of the 'self' and the 'other' were central, valuing cultural diversity and showing respect to cultural otherness for the promotion of intercultural learning and communication skills/ strategies and citizenship awareness.

Further objectives included building elementary school teachers' capacity to implement the proposed framework by applying DST with young learners. The research questions posed were the following:

1. What is the effect of Digital Storytelling on elementary students' writing skills in the learning of Greek as a second language?

2. How does the use of Digital Storytelling support students' intercultural- awareness raising?

Context of the study and participants

The program was implemented at a semi-urban state elementary school in Western Macedonia-Greece with 21 students (12 girls and 9 boys) attending two classes of the fifth grade (10.5–11 years). All participants attended the same school. In particular, 10 of them (7 girls, 3 boys) attended one class, and 11 of them (5 girls, 6 boys) attended the other. The students had an immigrant background being of Albanian, Bulgarian and Russian origin and have been learning Greek as a second language for the last four years.

A case study was considered the most appropriate strategy for our study, aiming to examine DST integration approach with a target group in the specific educational setting. A 'case' could be a small group (Miles et al., 2014, p. 28), while according to Robson (2011) a case study is 'a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence' (p.136). The small sample size was considered appropriate for the purposes of this current case study, as immigrant children were aimed at. Researchers focused on the specific sample, as the context of the school in question was relevant to the phenomenon of migration, in an area of rather low socioeconomic status where students were offered less educational resources. What is more, the case study was supported by multiple data sources for evidence (Yin, 2018, p. 15).

Research procedure

Design of the program

In order to better serve the aim and objectives of the 'VOICES' project, researchers built a four-axes interculturally-oriented framework, putting emphasis on developing the skills of the 21st century. The teachers of the participating classes were made aware of the framework after a training session with the researchers. More specifically, on the basis of a DST approach, emphasis was placed on the individual learner, the learner as a part of the wider community, the skills s/he is to acquire in a digital era and his/ her ability for life-long learning, as follows:

- The Digital Skills axis: In the proposed framework, students are provided with opportunities to develop and establish the 21st century skills, among which digital literacy is included. Students/ story creators are asked to critically search for information and images, to evaluate, interpret and analyze them, as well as synthesize them effectively by utilizing a range of digital technologies.

- The Autonomous Learner axis: Students perceive autonomy in the DST task, being responsible for their own learning and establishing relationships with peers, working in a truly motivating environment (Spanos, 2021).

- The Intercultural Awareness axis: In the specific multicultural context, DST plays a role in developing a sense of personal identity and culture

(Burgess, 2006) also encouraging interaction and communication among students with different yet distinct cultural backgrounds. Through digital narratives' composition, alternative points of view are expressed in a collaborative environment, aspiring to the enhancement of respect and social justice. In such a learning environment, boundaries created by diverse cultures or the curriculum, are crossed (Anderson &Macleroy, 2017).

- The Lifelong Learning Skills axis: In the specific framework, by creating space for multilingual narratives through a DST approach, creativity and critical thinking are prioritized. Language learning is engaged with meaning making and intercultural communication, while communication in a multilingual environment is celebrated.

Implementation of the program

Implementing the digital 'learning journey'

Thirty-six 45-minute long teaching sessions were spent on the DST pilot program during a three-month period (12 weeks). The rather limited time lapse allowed researchers to address the history threat to internal validity. Participating students could collaborate and interact with their non-native schoolmates in groups, creating their digital narratives of a maximum of three minutes.

Digital narratives were conceptualized as products where learners collected real-life stories from their relatives or community members of an immigrant background. Moreover, the school was 'open' to community members who could narrate their stories to students all through the pilot program. Diverse semiotic threads were interwoven for the creation of the family stories of migration, making them multimodal by following four stages, as indicated below.

Stage 1: Delving into real-life stories

Students were encouraged to interview their family members (parents or other relatives) about a) traditional stories they knew, stemming from their countries of origin, and/ or b) their real-life experiences on topics of war, migration and/ or c) historical events of significance for their countries of origin or their personal lives.Stories were narrated to the students in their native language and, then, they were mediated into Greek by the students themselves, in order to share the stories with their classmates.

Stage 2: Turning real-life stories into personalized digital narratives

During Stage 2, real-life stories, previously narrated by students of different origin in Greek, were processed. The researchers, in collaboration with the teachers of the classes, aimed at engaging students in well-developed, meaningful DST tasks to enhance their autonomous learning and encourage the development of their creative and critical skills.To this aim, students were made aware of the fundamental steps for DST (Lambert, 2013; Robin & McNeil, 2012). The steps pursued by the students for the creation of a digital narrative are summarized below (Robin & McNeil, 2012):

- Stay focused on a specific topic.

- Make your digital story personal by including some personal details.

- Present your perspective.

-Compose your story drawing on its beginning, middle, and end.

-Make a draft script of your story.

-Collect digital resources, searching for computer-based images or creating your own, also adding music, recorded audio narration and text.

-Work through the process of making digital stories together with others, using software applications. Storyboards should provide your audience with a textual and visual overview of the plan for the digital story.

- Share your stories through multimodal resources.

Following on, the students formed groups of three or four, in order to work on the content of their stories. Supportive material such as empathy maps or story cubes (Picture 1) facilitated students' participation into discussions, exploring cultural elements and attitudes, before composing their digital narratives. The software used by students to create their stories was available online (https://www.storyboardthat.com/,http://www.storylogicnet.eu/,https://www.plotagon.com/).

Pictures 1.
Students' working in groups with story cubes.

Stage 3: Interacting in an 'open to community' school context

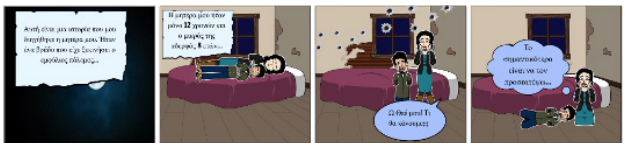
During Stage 3, the researchers, in collaboration with the teachers of the classes, aimed at motivating

students to work and to share knowledge and ideas, not just in school but across multiple sites, understanding that different languages can express history, culture and values. Peer groups interacted with the local community not only to present the products of their DST project work, but also to improve and expand them. In more detail, cooperation and interaction among students and members of the community were enhanced by a) participating in a drama workshop, focusing on the dramatization of real-life stories of migration or taking part in role-plays for the familiarization of students with issues of human rights, as well as the development of their cultural empathy, b) participating in a photography workshop, taking photos of areas of historical interest around the school area (e.g. villages with refugee population, heritage sites), familiarizing with concepts of nationality, identity and citizenship, c) interacting with a storyteller/ story writer based on historical events, listening to narrations and exchanging views on effective (digital) storytelling, and d) presenting multimodal products (e.g. digital narratives, video recordings, photographs)to parents/ guardians, school teachers and students of other grades.

Upon the completion of the program, the students created the following products:

- A lexicon of Greek, Albanian, Bulgarian and Russian words and phrases, adopting a translanguaging learning approach.
- Digital posters with multimodal texts, using relevant software (https://www.canva.com/, https://www.postermywall.com/).
- Portfolios with their storyboards, including both their drafts and final versions, empathy maps, edited and scanned pictures and their notes.
- Digital narratives and digital comics (picture 2).
- Video recordings of their participation in workshops.

Picture 2.
Students' digital narratives.



Stage 4: Evaluation process

During Stage 4, researchers, in collaboration with the teachers of the class, aimed at an on-going evaluation of students' communicative and digital competencies development, as well as their intercultural competence enhancement. More specifically, the evaluation process took place during the implementation and after the completion of the project, including multiple forms. The evaluation tools employed were self- and peer evaluation forms, portfolios with student products, as well as evaluation of the digital narratives on the part of the teacher. Focus was placed on both content and technical achievement, e.g. following guidelines regarding the story creation steps, embedding graphics and audio in a critical and original manner, checking grammar/ spelling and reflecting on the writing process, learners' attitudes and their engagement to create digital content.

Research instruments

The researchers employed multiple data collection methods, both qualitative and quantitative. Yin (2018) underlines that multiple sources of evidence are of vital importance to case studies, while Robson (2011) suggests that the sources of evidence are mainly qualitative.

Pre- and post-test

A pre-test and post-test model was employed with pre- and post-intervention measurements to assess the effect of using the DST approach on students' writing in Greek as a second language. Pre- and post-test included developing a short narrative by looking at two images provided by the teachers, supposing that one was showing the beginning and the other the end of a story. Each student wrote a short story (25-35 words), using a paper and a pen. The pretest was administered before the pilot implementation, while the posttest at the end of it. No changes were made in the instrument or scorers which could produce changes in outcomes, therefore threatening the internal validity of the experimental design.

In more detail, the pretest was administered by the end of January, before the implementation of the pilot intervention, while the posttest in the beginning of May, after its completion. The researchers were in collaboration with the teachers of the two classes, who reasonably anticipated that most students possessed enough knowledge to perform at an adequate level on the pre-test administration. The questions used on the pre- and post- assessment were not be provided to students on any other assignment before or during the pilot program. The questions used were the ones provided by the Greek Language Center for certification for A level of Greek language competence in writing (https://www.greek-language.gr/certification/). It is worth mentioning that the Greek Language Center is an official organization of the Greek proficiency certification exams, therefore high content validity was assured.

A teacher's journal

The teachers kept ten (12) journal records during the project (one journal per week). The journal was structured on the basis of the reflection questions to guide journal entries proposed by Richards and Lockhart (1996).

Focus group discussions

Focus groups were used as an explorative tool to identify students' perceptions, so as to generate hypotheses regarding the effectiveness of the pilot program. In the group discussions, two moderators (a researcher and a teacher) were used for each group. The questions were carefully developed by the researchers in cooperation with the teachers. After the discussions, children were allowed to ask questions themselves, in order to further explore their views on the topics discussed.

The factors suggested by Gibson (2012) for focus group discussions with students of a young age were considered by the researchers. Therefore, creating a trusting atmosphere, starting with an easy warm-up phase, ensuring that children do not feel observed and taking care to equally engage all participating children were taken into consideration. Focus group discussions were recorded, while the co-researcher was taking detailed notes. As research suggests, a setting was provided in the school library, which was not reminiscent of a classroom, in order to avoid provoking anxiety (Bauer etal., 2010, p.18). Seven children were assigned in each focus group. The duration of the focus groups was 45 minutes each, as suggested by Gibson (2012) for children of that age. Students were also informed that they could leave the discussion at any point they felt stressed.

Results

In order to estimate the efficacy of the 'VOICES' project, a combination of both qualitative and quantitative instruments was used, following a data triangulation approach (Kember, 2003).

Pre- and post-test

The non-parametric Wilcoxon test was chosen since the data did not follow normal distribution (Howitt & Cramer, 2011). The statistical package IBM-SPSS v.21 was used for the analysis of the data collected from the pre- and posttest.

The researchers drew on the elements defining communication competence proposed by Canale and Swain (1980), thus the criteria included:

1. Grammatical Competence, focusing on how to use the grammar, syntax and vocabulary in the target language.
2. Discourse Competence, concerning cohesion and coherence in written discourse.
3. Strategic Competence, referring to the appropriate use of communicative strategies
4. Critical Competence, regarding the interpretation of a social and cultural context in which the story is produced.

The analysis of the data collected from the pre- and posttest was made by adopting a 1-5 assessment scale on the basis of the abovementioned criteria. The processing of the data led to the results presented in the following tables. Results are presented in the following tables (Tables 1 and 2).

Table 1.
Pre- and post-test results

	N	Mean	Std. Deviation	Std. ErrorMean
Pre	21	2,57	1,16	0,25
Post	21	3,67	1,06	0,23

Table 2.
Pre- and post-test results (Levene's test for Equality of Variances)

	F	Sig.	T	Df	Sig. (2-tailed)	Mean Diffe Rence	Std. ErrorDiff.
Equal Variancesas-sumed	0.822	0.370	-3,180	40,000	-0,003	-1,095	0,344
EqualVari-ancesnotas-sumed			-3,180	39.680	-0,003	-1,095	0,344

The results presented in Tables 1 and 2 indicate that there was a statistically significant difference ($p < 0.005$) in communication competence between pre- and post-test. Therefore, data suggest that the DST approach provided students with opportunities to acquire communicative competence through writing.

Teacher's journal

The qualitative analysis of the journal data led to the creation of three typologies, namely A) Teaching Procedure, B) Student's Attitude and Responsiveness, C) Evaluation of the implementation process and outcomes, and several categories and subcategories under each typology (Table 3)

Table 3.

Categories and subcategories from teachers' journal data analysis

Themes	Categories	Subcategories	Frequencies
Teaching procedure	Goals	i. multiliteracies development	12
		ii. digital literacy development	12
		iii. communicative skills/ strategies development	12
	Methods employed	iv. collaborative learning	8
		v. game-based learning	10
		vi. differentiated instruction	7
		vii. working individually	4
	Teachers' role	viii. provision of multimodal prompts	10
		ix. encouraging translanguaging	12
		x. encouraging planning process (storyboards, scripts)	7
		xi. providing feedback	8
Student's Attitude and Responsiveness	Positive attitude developed	xii. learning as apleasurable/ creative experience	10
		xiii. collaboration	9
		xiv. active participation	8
		xv. reflection	9
		xvi. identity reshaping	4
		xvii. critical thinking	10
	Participation in digital learning activities	xviii. digital games	10
		xix. utilizing educational software	12
		xx. online presentations	6
Evaluation of the implementation process and outcomes	Problems encountered	xxi. time management	7
		xxii. cooperation for the creation of digital content	5
		xxiii. familiarizing with digital tools	9
	Educational Outcomes	xxiv. intercultural communication skills development	10
		xxv. multimodal and multilingual texts composition	10
		xxvi. using online libraries and dictionaries	9
		xxvii. digital skills development	12
		xxviii. drawing from multilingual repertoires	10
		xxix. cultural empathy	8
	Student engagement in the learning and evaluation process	xxx. self-evaluation	6
		xxxi. pleasure and enjoyment through creativity	10
		xxxii. taking responsibility for learning	8
		xxxiii. engagement and motivation	9
		xxxiv. positive attitude toward ICTs	9
		xxxv. citizenship awareness	7
		xxxvi. cooperation	9

It was observed that the application of DST in a game-based context enhanced task engagement, and enabled learners of various cultural backgrounds to compose multimodal and multilingual texts by drawing from their multilingual repertoires. Their communicative competence was acquired through writing creatively, while translanguaging pedagogy encouraged students' feelings of safety and freedom to express their ideas.

Searching for, analyzing and synthesizing a wide range of content helped learners develop their autonomy during learning and acquire digital and communicative skills. The data from the journal entries revealed that the methods employed allowed young learners to use interactive media, to convert non-digital materials and real-life stories they have collected into digital format. They demonstrated their comprehension, knowledge and empathy by conveying coherent linguistic, as well as paralinguistic messages.Therefore, it is assumed that the process enhanced their cultural empathy and intercultural understanding. Collaboration enabled knowledge sharing and decision making upon the use of appropriate digital media for the production of messages in the context of a digital narrative, also showing respect to cultural differences and diversity. Reflecting upon the learning process helped learners gain a better understanding of technology and perceive effective ways to convey their messages.

Focus group discussions

The qualitative analysis of the data collected from the discussions in focus groups are presented below (Table 4). In addition, exemplary students' quotes are included.

Discussion

In this study researchers focused on actively engaging elementary school students in the context of a multicultural classroom to develop L2 writing skills and to manage the sharing of digital narratives. The authors approached DST exploring pathways to the digital education era and permitting intercultural dialogue, through the 'power of stories to engage, transform and catalyse social action' (Carmona & Luschen, 2014, p.1). Developing literacies was connected to Listening to real-life stories in Greek as a second language and re-synthesizing them critically through the use of educational software. Communicating through the creation or re-creation and sharing of digital narratives and paying respect to classmates' culture enabled the realization of a number affective skills related to intercultural awareness. The DST project improved students' motivation in second language acquisition because they found learning through technology enjoyable and challenging. What is more, students seem to have learned strategies to writing and making meaning through the use of pictures, which they can employ in the language learning context.

"Creating an environment where children are invited to communicate and learn through multiple modes" and providing "different avenues of access for students" (Rumenapp et al, 2018, p.74) was observed to serve as a rationale and a plan for effective ICT integration. Students familiarized with the DST applications really quickly, therefore focus was placed on a multiliteracies pedagogy rather than just technology use. Culture-based materials and the implementation of a translanguaging pedagogy enabled students to express themselves in a relaxed language learning environment, feeling that their mother tongue is valued. In that way, they also had opportunities to acquire relative vocabulary in the target language in collaboration with their peers, building bridges between cultures.

The results of the study indicate that DST holds great potential in enhancing learners from diverse cultural backgrounds to write and express identities by sharing personal stories (Darvin & Norton, 2014). Furthermore, digital stories' composition is observed to foster empathy during second language learning, having 'a lot of positive potential' for intercultural competence (Mercer, 2016, p.98). This study is in agreement with relevant studies, where digital narratives' composition process a) provided students with a meaningful storytelling process (Yang & Wu, 2012), b) encouraged them to employ varied multimodal resources (Kim & Li, 2020) in order to create meanings in the target language (Hull & Nelson, 2005) and c) achieve effective communication in a multicultural context. Our study's findings also align with other studies indicating that through DST learners are engaged in the creative writing process, take pride in their work and show task commitment to develop their stories (Kikidou & Griva, 2023; Korosidou & Bratitsis, 2021).

With reference to the four axes of the interculturally-oriented language framework suggested by the researchers, it was indicated that a contemporary learning context supports opportunities to learn in an environment, where students actively engage with digital resources. Composition of multilingual digital narratives leads to digital literacies and communicative competency development, while values and attitudes are cultivated and intercultural competence development is promoted in school and community environments. The study is in line with previous research in the field (Yamaç & Ulusoy, 2017), implying that the DST improved story elements and word counts in stories. Previous research results also demonstrate a steady progress in the elements included in a digital story, the technology literacy and students' competency during the process (Yamaç & Ulusoy, 2017).

Table 4.

Categories and subcategories from focus group discussions

Category	Question	Theme	Exemplary Quotes
Process of learning	What do you think about the project (program) you took part in?	1. I find my classmates' stories useful.	'I liked this storytelling project because I can learn a lot about my peers. I found their stories helpful'. 'Through stories we can exchange ideas and solve problems together'.
		2. I like the storytelling activities.	'Using (empathy) maps and games to write my story is easier.' 'I like the maps... I take my ideas down and then I think about my character and I create him.'
		3. It is interesting to learn through images, recordings and videos.	'We can choose pictures or we make our own.' 'We can change the appearance of the characters on the screen. And then it's like they are alive because we also have the sound and the images.'
		4. (Drama) Workshops help me understand how characters feel.	'When I played the role, I felt very stressed. It was like I was in danger, not the character I was playing. I felt how she (i.e. the character) felt'.
		5. I had a lot of opportunities to learn about other cultures.	'I was learning Greek but I also learned about my peers' cultures and I appreciated their different cultures'. 'I can share my culture and I want to learn a story from other cultures'
	How did you feel when working in the project?	6. I enjoy telling my story in class.	'I think the story is something personal that I share and then all of us can write a story. This is fun!'.
		7. I feel more comfortable when working on a software.	'The application helped me stay focused on the story; it was easier for me to write my story because I watched the boxes (i.e. provided by the DST software) and I was feeling lost.'
		8. I feel motivated to tell a story using a software.	'...the application can help me draw something and then I don't have to write it. I like it very much.' ' I can draw something relevant to the text and then my classmates can see what I drew and then we can write together. We can do that on the computer."'
		9.Working in group to write a story is fun.	'It is more fun working with others to write a story.' 'I can help them and they can help me, I Like it! Working in groups is great pleasure.'
		10. I like games and workshops.	'I liked the story cubes because they inspired me, I had more ideas' 'In the workshop I felt I was given an opportunity to share things the way I felt they were.'
		11. I feel my native language is valued.	'I had an opportunity to use my mother tongue and this helped me create my story. I can translate the language into Greek when I share it in class, my classmates or my teacher can help me.' 'It's my culture and I am proud because my grandma told me this story and I was crying when I listened to it. And many words were in Russian and I could tell them to my friends; now I even know the words in Greek.'
Perceptions of the DST approach	What did you like about the project?	12. Working on a digital device is motivating.	'This tool (i.e. the DST software) was great! I could see what my classmates wrote and drew and then I felt that it was my turn to create.'
		13. I can better develop my ideas with DST applications.	'With the DST tool I feel free to write and use images, it's easier for me.' 'I do not feel restricted when I use the application, it's about the pictures and the sounds because they help me write.'
		4. I can improve my writing skills.	'Pictures are helpful because we can see the objects. We can write one word (i.e. the object name), then we write how it looks like or the color and then about other things around it.'
		15. I can better understand Greek in digital narratives.	'I can understand vocabulary that I did not know about my culture because I see the images and I listen to the sounds... if they are frightening for example the words something bad.'
	Would you like to participate in a similar project in the future?	16. It was innovative.	'Yes! I like it so much. It's something new.' 'It's the first time we create digital stories.'
Challenges encountered	What were the difficulties you encountered?	17. I cannot always finish my work in time.	'It takes a lot of time.' 'We need more time to make a story.'
		18. I find it difficult to use the appropriate vocabulary.	'The vocabulary is difficult. We don't know it. We have to look it up in the dictionary.' 'We don't know the words and we can't use the pictures that we don't know the meaning in Greek.'
		19. I find writing correctly difficult.	'Grammar is difficult.' 'I feel worried because I sometimes know some words but Greek grammar is difficult.'

More specifically, in relation to the Digital Skills axis, DST proved to comprise a tool for teachers and an interesting task for learners; it motivated learners to find a topic of interest connected to their real-life environment, to investigate various sources and create their own stories. In further detail, literacies and, particularly, writing were developed within a framework where culture was valued and learners were encouraged to create stories focused on cultural stimuli, sensitizing their audience to issues of cultural differences. Multimodal composition, therefore, seems to enable the presentation of stories in multiple forms-written, visual, musical, spoken-also facilitating multimodal communication in the second language. Furthermore, DST was observed to enhance the adoption of a creative stance towards the digital media, fostering multiliteracies development in a contemporary world wheremultimodal communication is the norm (Cope & Kalantzis 2000).

Concerning the Autonomous Learner axis, the results of the present study indicated that learner autonomy is realized in students' ability for critical and creative thinking in a collaborative environment in the following ways:

> a) Students/ digital narratives creators work collaboratively to search for, process and synthesize information, producing just enough digital content, without overloading the viewer with unnecessary information. Therefore, they engage in a critical thinking learning process.
>
> b) Students who are effective creators seem to develop enhanced communication skills, engaging in a learning process where they organize their ideas, ask questions, express opinions and arguments while viewing their work or their classmates' work in a critical manner (Korosidou & Bratitsis, 2021).
>
> c) DST process also allows young learners to develop their collaboration and problem-solving skills, to generate ideas and create meaningful content while interacting with digital media (Korosidou & Bratitsis, 2020; Korosidou, Bratitsis & Griva, 2021).

With reference to the Intercultural Awareness axis, in our study, students' engagement in DST and related activities in a game-based context allowed peers to enhance their empathy and sensitivity towards different cultures, to explore values and interrelations and support intercultural relationships. DST was indicated to improve intercultural communication skills and open mindedness, as well as to promote the development of 21st century skills, such as creativity, collaboration and digital literacies. The results of the present study are in line with previous research which examined the influence of applying DST on students' critical thinking ability. It was proven that DST helps improving students' critical thinking skills (Botfield et al., 2018; Chan, 2019). DST seems to aid young learners in delivering their views and thoughts in a multimodal context. The story creators use multimedia while they develop their ability to empathize with the characters in the storyboards and the videos. Journal data and focus group discussions showed that participants in the present study were facilitated in shaping their cognitive processes and creativity during the DST process, by synthesizing, compiling and interpreting aspects embedded in their real-life stories. Examining, evaluating, and making decisions regarding the story content were also encouraged during the creative process of turning an oral story into a digital one, in written form. Learners were able to observe the actual creation of a narrative text in a digital environment, therefore DST seems to have served as the most effective method for enhancing their critical thinking.

Regarding the Lifelong Learning Skills axis, the students were engaged in a) examining storytelling elements, e.g. the narrator's point of view, and b) reflecting and commenting on their peers' work. Such activities generated interest and attention and honed students' lifelong learning skills, such as their critical thinking and/ or their metacognition skills.

Implications and recommendations

In conclusion, this current study provided insights that underline the importance of designing and implementing appropriate DST programs in our contemporary, multilingual and multicultural language learning classrooms. In that vein, both the constant realization of the role of all stakeholders and the evaluation of the learning needs can significantly affect the accomplishment of the goals set. Summarizing upon the key findings from our research and tracing an appropriate pedagogical framework for carrying out DST work in schools we unfold the implications for educational policy and teacher professional development, as follows:

- Teachers need support and guidance on using technology effectively for educational purposes, employing the appropriate tools to achieve their goals.
- Teachers can incorporate culture-based materials in target language learning because they can facilitate students' literacies development.
- Disseminating inspiring practices will help teachers prepare for and gain confidence in using technology meaningfully in class.
- Device availability and upgrading, as well as technical support can promote the building of a literacies-oriented teaching and learning framework.
- Technological tools can facilitate the creation of online collaborative networks among schools to share multimodal material created (e.g. digital narratives uploaded online on a DST school site/ platform).

- Language teachers should integrate communicative competencies development in a digital environment, as language teaching is primarily connected to functioning effectively in an increasingly digital world (Dudeney, 2015).

- A DST community can be created aiming to foster non-native students' writing skills and ensure that all children can develop the intercultural skills they need as citizens of the 21st century.

Limitations and suggestions

Limitations of the study include the sample size. An expansion of the 'VOICES' project is required for its promising results to be generalized. The feasibility of the interculturally-oriented framework proposed should also be examined in other contexts in order to identify any further beneficial effects for other age groups, as well as the population of other classes, at different proficiency levels and within a larger intervention span.

Future research is suggested to investigate how a) multilingual DST can be utilized to enhance engagement with digital technology and encourage competencies development and b) professional development of educators can be facilitated through the creation of a contemporary language learning framework. Future studies may also target the successfulness of the DST process by including a control group, also catering for threats to internal validity of the experimental design.

Conclusion

The present study examined the role of digital storytelling (DST) as a technology-oriented method of developing second language writing. The study aimed at improving young learners' abilities in order to encourage them to write more effectively. An interculturally-oriented language framework was introduced to better address young learners' literacies in a stimulating environment, where they were encouraged to spend time online and engaging with digital applications. The results of the study serve as a proof to the efficiency of DST in enhancing young learners' writing skills by integrating DST in the context of Greek as a second language learning. According to the results and participants' viewpoints obtained from the quantitative and qualitative data, it is indicated that employing DST can have a positive impact on young learners' attitude toward L2 writing. DST can provide a safer and more creative teaching context to develop learners' L2 writing skills. The DST approach can also increase their communication and intercultural competence in a multilingual and multicultural classroom environment.

Writing is considered as a fundamental, yet difficult skill to acquire. As a result, opportunities and assistance offered through novel approaches and interesting activities, that do not follow the traditional processes to learning how to improve writing, can be employed as a continuous incentive for improving writing skills. Therefore, DST should be taken into account by L2 instructors, materials developers and stakeholders as an efficient and powerful tool for both teaching and learning.

Disclosure statement

The authors declare that they have no conflict of interest.

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The Representation of Peace Values in Indonesian Primary School Textbooks: Marrying of Ecovisual Judgment Theory with Environmental Literacy

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Abstract

This qualitative research, employing content analysis, aims to achieve two objectives: (1) to examine self-values, which encompass the categories of literacy and environmental assessment, and (2) to explore social peace values, which include the categories of content and environmental literacy assessment. The research data consist of images accompanied by textual elements sourced from Indonesian language textbooks used in grades 5 and 6 of primary schools. These textbooks are published by the Center for Curriculum, Research, and Book Development, which operates directly under the Ministry of Education and Culture, Republic of Indonesia in support of the Sustainable Development Goals (SDGs). The findings of the research reveal that (1) the values of oneself include acceptance of conditions, wisdom, adherence to rules, patience, consistency, cleanliness, hard work, creativity, enthusiasm, and hard work. Meanwhile, (2) the values of social peace consist of cooperation, care for the environment and other living beings, togetherness, and respect for others' rights. These two categories are spread across texts of types environmental behavior, knowledge, affect, and cognitive, which are included in the categories of social esteem and sanction. Overall, the findings of this research indicate that the discursive practices within the textbooks aim to shape individuals who are independent and cooperative, with an emphasis on inclusivity, appreciation of diversity, and mutual intercultural respect in fostering environmental peace. The analytical framework developed in this study represents a novel contribution to environmental discourse analysis and can be utilized by future researchers, both locally and globally, to study textbooks. Future research could focus on a lexico-grammatical analysis of engagement and graduation elements, with the aim of deepening understanding and enhancing the delivery of sustainability solutions.

Keywords:

Appraisal Theory, Environmental Literacy, Indonesian Language, Language Textbook, Moral Value

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Introduction

The environment is a green natural resource, and its sustainability must be preserved to achieve a peaceful and harmonious life (D'Apice & Bromley, 2023). With this goal in mind, the United Nations proposes Sustainable Development Goals (SDGs) to ensure long-term global prosperity by integrating sustainability into education. This integration is crucial for realizing this concept (Andajani et al., 2024; Suwandi et al., 2024). In this context, significant contributions can be made toward achieving SDGs 4 (Quality Education) and SDGs 13 (Climate Action). As a country known as the "lungs of the world" with the second-largest forest area after the Amazon (Prastio et al., 2023; Andajani et al., 2024), Indonesia plays a crucial role in promoting sustainable living and supporting the measures outlined by the UN in the Sustainable Development Goals (SDGs). The Indonesian government has addressed this through Law Number 32 of 2009, which establishes standards and regulations for environmental conservation efforts to prevent and mitigate environmental degradation.

One concrete step toward this goal is the integration of Environmental Literacy (EL) content into the education curriculum. This aims to foster environmental awareness and responsibility, shaping attitudes, values, and actions based on an understanding of the potential detrimental impacts (Pratiwi et al., 2022; Lee & Kang, 2023; Suwandi et al., 2024; BR, 2024). Based on these facts, significant contributions can be made to shape a younger generation that cares about the sustainability of current and future life. Sustainability in education goes beyond merely teaching environmental content (Micalay-Hurtado & Poole, 2022; Pratiwi et al., 2022; Gultekin & Yigit Gencten, 2024). It requires the integration of sustainable practices and principles throughout the education system (Kapranov, 2022; Roekhan et al., 2024). Regrettably, evaluations related to the integration of sustainable practices and principles throughout the education system have not been widely discussed by previous researchers in Indonesia. Nevertheless, it is a crucial initial step in shaping environmental consciousness (Karatekin, 2012; Imelwaty et al., 2022; Curdt-Christiansen, 2020; Gultekin & Yigit Gencten, 2024), especially when children begin to learn social interactions outside the family through texts and visual elements (Puspitasari et al., 2021). In this context, character formation through a combination of visual elements and text that promotes peace values is essential.

Peace value is one of the essential positive values that every individual in the world should possess (Roekhan et al., 2024), particularly considering the rising global conflicts such as bullying, cyberbullying, wars, land disputes, etc. Research by Andajani et al. (2024) on discursive practices in instilling peace values to foreign students learning Indonesian language shows its role in creating individuals who support a more harmonious life with themselves and the social environment. In Ethiopia, Gebregeorgis (2017) revealed that such practices in textbooks are used to promote safer and more stable conditions, as well as reduce crime incidents and conflicts. Therefore, instilling the value of peace in elementary school students will reduce negative behaviors. This approach is expected to minimize violence, foster empathy, enhance effective communication, cultivate exemplary leadership, and reduce stress and tension.

In evaluating how discursive practices shape the values of peace embedded in textbooks, it is necessary to draw on theories developed within the framework of systemic functional linguistics. One such theory, appraisal theory, particularly focusing on the aspect of attitude, is useful for evaluating the values conveyed in both spoken and written texts (Puspitasari et al., 2021). Similarly, it is valuable for assessing the language used to express attitudes, build social relationships, and influence listeners or readers in communicative contexts (Martutik et al., 2024). Additionally, this theory can be applied across various discourses, such as advertising discourse (e.g., Istianah & Suhandano, 2022), academic text evaluation (e.g., Hashemi & Mahdavirad, 2023), and news texts (e.g., Puspita & Pranoto, 2021). In the context of this research, the theory is applicable and can be employed in English Language texts within elementary school textbooks. Therefore, exploring content related to the discursive practice of instilling peace values through appraisal theory is highly relevant, allowing researchers to comprehensively investigate how moral values are formed, distributed, and negotiated in communication (Imelwaty et al., 2022; Andajani et al., 2023). Such research enables a deeper understanding of discursive practices as they are manifested in textbook texts.

One aspect of evaluation in appraisal theory is attitude, specifically the types of judgment: esteem and sanction. According to Mayo and Taboada (2017), the attitude system can be considered central to appraisal theory because it provides core expressions of feelings and evaluations of people and objects. Therefore, utilizing the judgment system helps to identify how the discursive practices structured by textbook designers contribute to character formation that impacts sustainable living. In this study, the focus on analyzing visual elements accompanied by textual judgments within textbooks allows for a more holistic evaluation of how various elements represent and influence children's understanding of the world around them (Puspitasari et al., 2021). For example, in this context, understanding the importance of positive behaviors toward rivers, nature, and forests. Such studies serve as important mediums for examining how curriculum designers introduce cultural representations, identities, and positive values to

elementary school children through visual and textual elements, emphasizing a multimodal approach. This has also been demonstrated by previous research. For instance, studies on judgment by Puspitasari et al. (2021) and Sulistiyo et al. (2020) found that the discursive practices in English textbooks for elementary school students in Indonesia are intended to introduce and even instill certain values aligned with the ideology of the Indonesian state. Meanwhile, in the context of teaching Indonesian as a foreign language, studies by Roekhan et al. (2024) and Andajani et al. (2024) have been conducted to support learners in achieving communicative competence, meaning a deep understanding of the Indonesian language and culture to minimize social conflicts.

The lack of research on incorporating peace values through textual content combined with visual elements in EL texts in primary school textbooks using attitude theory makes this research a pioneering study. To date, observations show that research on discursive practices of instilling peace values in Indonesia has been limited. Turnip and Yanto (2021) conducted a study on English language learning textbooks at the junior high school level using critical discourse analysis but without considering attitude studies. Similarly, Roekhan et al. (2024) and Andajani et al. (2024) focused on Indonesian language textbooks for foreign speakers with different text types. Abroad, there have been studies like Gebregeorgis (2017) analyzing English for Ethiopia Student Textbook Grade 9 in Ethiopia, and Akbana and Yavuz (2022) studying coursebooks from level A1 to C1 in Turkey.

Over the past two decades, research on EL texts both in Indonesia and abroad has mainly concentrated on content analysis. For instance, Suwandi et al. (2024) explored Indonesian language textbooks at the high school level, while Lee and Kang (2023) focused on Korean language learning books in China. At the primary school level, studies like Karatekin (2012) discussing social studies textbooks in Turkey, and Curdt-Christiansen (2020) studying language textbooks in China are notable. This research aims to contribute to the EL research literature by employing critical linguistic theory, particularly the Appraisal Theory (AT). Previous studies have mostly utilized other types of critical linguistic theories. For example, in Indonesia, Triyono et al. (2023) utilized eco-linguistic theory in examining English language textbooks for senior high school students. However, there is still limited research on EL utilizing critical linguistic theory in Indonesia. Abroad, research such as Cristovão et al.'s (2022) study on English language textbooks in Brazilian public secondary schools and Micalay-Hurtado and Poole's (2022) proposal of ecocritical language awareness in English language learning contexts indicate avenues for further exploration.

In line with the foregoing discussion, integrating the concept of environmental peace with Indonesian Language education helps to enhance environmental awareness and ethics among children. Meanwhile, the attitude system, particularly the types of social esteem and sanction judgments within appraisal theory, aids in exploring the discursive practices employed by the Indonesian government in shaping future generations capable of realizing sustainable living. As such, this integration can shape a younger generation that is more caring and responsible towards the environment through the right pedagogical approach and policy support. In Indonesia, these concepts are included in the elementary school curriculum through various subjects and extracurricular activities (Triyono et al., 2023). This research focuses on Indonesian language textbooks. The material presented in these textbooks influences students' attitudes and behaviors towards the environment by providing elements, such as inspirational stories, informative texts, and interactive activities, in addition to teaching language skills. Similarly, the findings of Andajani et al. (2024) conclude that language learning textbooks are not only useful for teaching language skills and vocabulary but also for spreading important ideas about sustainable living. Therefore, the results of this research have the potential to provide insights into the strengths and weaknesses of the pedagogical tools used in the Indonesian curriculum. In short, it provides valuable information to determine the effectiveness of character formation that supports the sustainability of life in this planet. Lastly, this research has two objectives:

1. to explore the content of discursive practices in instilling peace values within oneself through textual elements combined with visuals in EL texts in primary schools, using the judgment category in the appraisal theory.

2. to examine the discursive practices in instilling peace values within the social environment through textual elements combined with visuals in EL texts in primary schools, using the judgment category in the appraisal theory.

Literature Review

Insights Related to Indonesian Language and its Teaching

At present, Indonesian is spoken by approximately 269 million people (Hamdani et al., 2022). Many Indonesians learn standardized Indonesian in formal institutions. Standard Indonesian has rigidly defined clause structures but flexible arrangements of clause elements in everyday usage. This diversity arises because not all Indonesians have Indonesian as their mother tongue; they speak regional languages according to their upbringing. Indonesia is a multilingual and multicultural society with 742 languages/dialects, encompassing numerous

ethnic and sub-ethnic groups totaling no fewer than 478. Given this diversity, it is understandable that Indonesian language learning programs exist to help learners master various standardized forms. Functionally, Indonesian serves as a unifying language and communication medium, fostering strong social relationships and expanding social networks across diverse linguistic backgrounds. According to Pratiwi et al. (2023), Indonesian language education aims to enhance the communicative competence of native Indonesians in standard, informal, and formal language, taught from primary school to university through textbooks.

In Indonesia, books are developed by the government or credible, licensed private parties. Textbook development in Indonesia must adhere to the state's ideology, Pancasila, and therefore should not contain elements such as ethnic, religious, racial, and inter-group issues, pornography, or any other content considered contradictory to the moral values upheld by Indonesian society (Andajani et al., 2024). According to Law No. 3 of 2017 on the Book System, the Indonesian government is required to provide quality textbooks in line with the applicable curriculum, which is currently competency-based. The circular letter issued by Pusat Perbukuan (2019) outlines several indicators that must be met in developing instructional textbooks: they should promote positive morality, include not only theories but also practices, promote literacy (e.g., digital, science, basic, economics, health, environment), develop 21st-century skills, and adapt to technological advancements, social diversity, and High-Order Thinking Skills (HOTS). These indicators should be realized through various engaging instructional activities, aimed at achieving the objectives of the current curriculum applied in Indonesia.

Currently, the Indonesian government develops textbooks for students from kindergarten to senior high school levels. The arrangement of materials at the primary school level follows the applicable curriculum and the developmental stage of students (Roekhan et al., 2024). Specifically in this research, the focus was on primary schools that utilize the Indonesian government's curriculum, textbooks, and policies to support sustainable and peaceful living. Primary schools in Indonesia consist of six grades, which is taken into account when developing instructional materials for Indonesian textbooks to clearly differentiate between levels. In general, children in Indonesia attend primary school from ages six to twelve, so the development of textbooks also considers age-related characteristics. These factors serve as references in developing instructional materials and determining the progression between grades in primary schools (Fuchs et al., 2022). In Indonesia, materials for lower-grade primary school students focus on developing four language skills, arithmetic skills, and efforts to instill positive moral values prevalent in the country. Textbooks covering these subjects are designed to be multimodal, meaning that they are presented with pictures and illustrations that help improve students' understanding. This design aims to facilitate faster comprehension of the materials and helps students to focus on the content being taught.

Textbooks as Discursive Practices in Instilling Peace Values

One of the essential learning resources that influence and enhance students' competence is textbooks. Textbooks not only teach vocabulary and grammar but also emphasize the introduction and instillation of positive values that are beneficial for students' lives (Gebregeorgis, 2017; Puspitasari, Widodo, et al., 2021; Lee & Kang, 2023; Suwandi et al., 2024; Andajani et al., 2024; Roekhan, Suyitno, et al., 2024) . This is related to the introduction of language, culture, and morals associated with the language being studied, where the use of language that considers cultural context, interlocutors, and conversational situations will create peace (Roekhan et al., 2024; Sadiah et al., 2024). Considering this, it is not surprising that textbooks play a strategic role in enhancing EL skills and sustainable peaceful living (Lee & Kang, 2023).

Furthermore, peace values have a long history in educational curricula around the world, particularly in response to the many negative situations and conflicts, especially in regions prone to violence. Promoting peace values is essential because peace is the foundation for global security, sustainable development, and the protection of human rights (Gebregeorgis, 2017). To create such conditions, Pratiwi et al. (2023) state that the use of positive language resulting from the learning process plays a key role, for instance, in resolving conflicts peacefully through dialogue and diplomatic talks, negotiations, and mediation using language as an intermediary. Therefore, creating a safer, fairer, and more prosperous world for everyone involves leveraging the role of learning or education. As a step in creating a peaceful atmosphere, Balasooriya (2001) proposed the concept presented in Table 1, which is useful as a guideline for discursive practice.

Table 1.
Peace Value

No	Type of peace value	Reference
1	Peace value with oneself	Happy, patient, consistent, religious, creative, clean, hard-working, accepting, wise, honest, diligent, enthusiastic, etc.
2	Peace value with social environment	Democracy, cooperation, respect for human rights, social justice, friendliness, respect for social and cultural differences, togetherness, politeness, tolerance, etc.

Finally, in language learning, the concept of instilling peace values is integrated through visual and textual elements (Andajani et al., 2024). According to functional language theory, Ariyanto (2018) states that "language is a social practice" and emphasizes the importance of context in language use. This implies that multimodal elements, combined with microlinguistic elements in texts, are designed with specific goals in mind to meet the objectives set by curriculum and textbook designers. Various social practices and discursive activities for students are facilitated through textbooks (Roekhan et al., 2024; Khokhar, 2024). In this research context, the use of images related to the EL that contain words, clauses, and even sentences is intended to instill peace values.

The Concept of Environmental Literacy to Support Environmental Sustainability

Environmental Literacy (EL) helps individuals develop sensitivity and take positive actions towards the environment, supporting sustainable living on Earth (Lee & Kang, 2023). This concept is fundamental to EL (Suwandi et al., 2024). Historically, EL was introduced by UNESCO in 1975 through The Tbilisi Declaration, which emphasized the importance of promoting environmental awareness, knowledge, and responsibility among citizens to address current and future environmental challenges. Roth (1992) further refined this concept by focusing on the understanding, knowledge, attitudes, and skills necessary to address environmental issues. The concept of EL was eventually expanded and adopted by the North American Association for Environmental Education (NAAEE), comprising four elements: cognitive knowledge, skills, affect, and behavior (Hollweg et al., 2011). It is crucial to introduce these concepts to children as early as possible. In this research context, instilling the concept of EL in primary school children is important because this period is a critical phase for shaping their character and personality. Their future attitudes and behaviors are largely determined during this phase (Imelwaty et al., 2022).

EL will enhance individuals' awareness of environmental crises. This is a tangible step towards creating environmental sustainability (Gursel-Bilgin et al., 2023), a concept of living that meets present needs without compromising the ability of future generations to meet their own (BR, 2024). Therefore, EL and environmental sustainability complement each other, emphasizing the importance of understanding, respecting, and protecting nature for both current and future generations. Both concepts play a crucial role in increasing environmental awareness, promoting responsible behavior, and nurturing resilient and sustainable children. However, to achieve this, Roekhan et al. (2024) suggest that EL integrated into the curriculum must be supported by competent teachers, engaging teaching methods, and involvement of parents and communities to effectively raise awareness and promote sustainable actions among students. In short, collaboration among various stakeholders is essential.

Table 2.
Competencies and Indicators of EL by Hollweg et al. (2011)

No	Competencies	Indicators
1.	Ecological Knowledge	Knowledge of physical and ecological systems Knowledge of social, cultural, and political systems Knowledge of environmental issues Knowledge of various solutions to environmental problems Knowledge of citizen participation and action strategies
2.	Environmental Affect	Sensitivity to the environment Attitudes, concern, and views towards the environment Personal responsibility Control and perception Motivation and intention
3.	Cognitive Skills	Identifying environmental issues Asking relevant questions Analyzing environmental problems Investigating environmental issues Evaluating and making personal judgments about environmental issues Using evidence and knowledge to solve problems Creating and evaluating plans to address environmental issues
4.	Environmental Behaviour	Assisting in preventing or solving environmental problems Encouraging others to take correct actions on environmental issues Using financial support to aid in restoring or solving environmental problems Pressuring political institutions or government to take positive action on the environment Supporting rules designed for environmental improvement or preservation

Research Method

Types of Research and Data Sources

The approach adopted by this research for data collection was qualitative, specifically content analysis. According to Suwandi et al. (2024), qualitative content analysis goes beyond merely counting the frequency of characters in a text; it seeks to understand social reality and context in a broader sense. This approach is inherently connected to the meaning, intention, consequences, and context, and it involves describing words, phrases, or sentences while considering the contextual environment (Para, 2024). Thus, it provides detailed data and enables a comprehensive understanding of real-life scenarios.

Visual elements related to EL were sourced from six Indonesian language textbooks for primary school students, from grades 5 and 6. These textbooks are published by the Center for Curriculum, Research, and Book Development, which operates directly under the Ministry of Education and Culture, Republic of Indonesia. Therefore, the books met the established criteria. Similarly, Pratiwi et al. (2023) state that when selecting data sources from educational artifacts for analysis, researchers must consider reliable sources to obtain accurate and trustworthy results.

The researchers identified three considerations in determining the data sources: (1) they were the primary sources for most private and public schools in Indonesia, and possibly for Indonesian primary schools abroad, (2) they contained rich verbal and visual content related to environmental literacy, crucial for fostering positive attitudes supporting sustainable living, and (3) the authors of these books were experienced professionals in educational material development. This study included only a representative sample of comments obtained from observations, not all collected data. According to Martutik et al. (2024), data collection of this nature would not be effective if done randomly without further specific considerations. Therefore, the researchers established several criteria to ensure the validity of the presented data. In this study, the criteria used to assess data suitability were: (1) alignment with the research objectives, (2) representation of phenomena related to environmental conservation efforts, and (3) the most representative data elements aligned with the research objectives for presentation. However, these criteria were developed by the researchers themselves, which raises concerns about potential bias. Even though the authors have extensive experience in qualitative research, their personal or professional perspectives might influence the data presented (Pratiwi et al., 2023). To reduce research bias and ensure the data is valid and reliable, researchers should conduct a Focus Group Discussion (FGD) with experts in the relevant fields (Para, 2024). In this research, the researchers consulted three experts: one in teaching Indonesian to elementary school children, one in developing teaching materials based on environmental literacy, and a linguist specializing in applied linguistics. The data reliability and agreement among these experts were over 95%, indicating a reliable data system.

Analytical Framework and Data Collection Procedures

This study adopted a theory stemming from the development and expansion within the Systemic Linguistic Functional framework. Specifically, the sub-attitude within AT, as proposed by Martin and White (2005), served as a framework for analyzing EL texts containing peace values. These elements can be conveyed either implicitly (spoken) or explicitly (written), and they can be evaluated as positively or negatively oriented (Martutik et al., 2024). In connection with this, further classification focused on Judgment, examining individual actions' assessment through social esteem and social sanction, with subcategories detailed in Table 3. For the analysis of EL texts, we adopted the concept from Hollweg et al. (2011). Thus, the concept of peace values further guided us on understanding how aspects of peace operate within oneself and socially.

Table 3.

Judgment by Martin and White (2005)

Type of Negative Judgment	No	Category	Description	Example Reference of Meaning
Social esteem	1	Normality	Appropriateness in what is being assessed	Admirable, fascinated, appropriate, usual, right, fortunate
	2	Abnormality	Inappropriateness in what is being assessed	Hapless, unlucky, also-ran, obscure, star-crossed, peculiar, odd, unpredictable, eccentric, erratic, dated, daggy, retrograde
	3	Capacity	Competence in what is being assessed	Strong, sturdy, durable, talented, insightful, prosperous, skilled, expert, productive, reasonable
	4	Incapacity	Absence of competence in what is being assessed	Wimpy, mild, weak, crippled, sick, unsound, helpless, childish, immature, slow, stupid, thick, dull, grave, dreary, flaky, neurotic, insane, native, inexpert, foolish, unsuccessful, unproductive, uneducated, illiterate, ignorant, incompetent, unaccomplished
	5	Tenacity	Mental character in what is being assessed	Tenacious, consistent, adaptive, tireless, accommodating, brave, gallant, resourceful, sincere
	6	Intenacity	Absence of mental character in what is being assessed	Gutless; cowardly; timid; rash; impatient; impetuous; reckless; capricious; hasty; weak; distracted, despondent; undependable; unreliable; stubborn; obstinate; willful; unfaithful; disloyal; inconstant
Social sanction	7	Veracity	Truthfulness of someone's action	Honest, straightforward, trustworthy, and wise
	8	Inveracity	Insincerity in what is being assessed	Lying; deceitful, dishonest; manipulative; devious; deceptive; blabbermouth; blunt
	9	Propriety	Positive moral evaluation possessed	Good, ethical, fair, law-abiding, polite, charitable, simple, sensitive, caring
	10	Impropriety	Negative moral evaluation in what is being assessed	Evil; immoral; bad; selfish; greedy; avaricious; rude; discourteous; irreverent; vain; arrogant; cruel; mean; insensitive; corrupt; unfair; unjust

The data analysis procedure for this research adopts five stages, taking into account Creswell's (2014) ideas on data analysis. The first step begins with observing the distribution of environmental themes in each textbook analyzed, which serves as a guide for organizing the raw data. The second step involves preparing the raw data for analysis. At this stage, the researchers also ensured that the data contained values of peace according to their categories (see Table 1), components of EL (see Table 2), and Judgment (see Table 3). Examples of the results from this stage is presented in Table 4. The third step involves re-reading the collected data to further verify it with the experts who participated in the FGD, as described earlier. The fourth step is classifying the data based on identification and validation results. The fifth step involves analyzing the data by connecting it with several relevant theories and previous research findings.

Table 4.
Example Data Analysis

No	Theory	Example Data	Analysis Result
1	Peace Value (2001)	He also managed to plant banyan trees and ornamental plants.	Peace value - Peace values within oneself in the form of hard work, diligence, and creativity
2	Martin & White's (2005) language appraisal theory		Judgment -social sanction + propriety
3	Competence and Indicators of Environmental Literacy by Hollweg et al. (2011)		Environmental literacy category - Environmental behavior with steps to help restore or solve environmental problems

General Findings

Discourse categorized under judgment is used by textbook developers to engage in discursive practices of instilling peace values in children. Regarding the manner of delivering judgment, social esteem type is used to respond to environmental conditions, while sanction is used to evaluate individuals' actions towards the environment. It represents the values of locality based on the context in which these values are embedded. A child at the primary school level begins to learn to behave according to socially acceptable norms as their understanding of right and wrong develops through social interactions (Puspitasari et al., 2021). Therefore, these findings manifest the peace values applied by Indonesian society in realizing sustainability.

Based on the findings, discursive practices of instilling peace values within oneself are conducted by textbook developers to instill values in children. This is done through introducing the concept of integrating reduce, reuse, and recycle. Research findings in Turkey indicate that the integration of these concepts into education enhances individuals' awareness of zero-waste activities and recycling (Bulut, 2020), thus indicating a commendable initiative. Meanwhile, social peace values emphasize the practice of instilling willingness to engage in collaborative problem-solving, which has a positive impact on fostering critical environmental attitudes (Amin et al., 2020). This is done through discussions, commitments, demonstrations, and actual greening actions. Based on these findings, the Indonesian education curriculum has supported sustainability discourse by training children to think critically.

Based on findings related to visual elements, it becomes evident that multicultural and gender concepts are portrayed. The introduction of multiculturalism aims to teach children about inclusivity, diversity appreciation, and mutual respect among cultures to foster sustainable living. Consistently, through images representing various ethnicities, cultures, and backgrounds of children, children become aware of the diversity in the world they live in (Parlindungan et al., 2018). These findings depict differences in skin color, hair types, and belief systems. As stated by Pratiwi et al. (2023), these characters are considered to represent the diversity of Indonesia, including cultural, geographical, religious, and gender differences. Therefore, the textbooks examined create an inclusive learning environment to support the development of social and emotional understanding. Multicultural visuals can also help children feel represented and valued in their school curriculum (Setyono & Widodo, 2019). It is also noted that this research reinforces previous studies. For instance, it enhances students' semiotic repertoire, increases awareness of environmental issues, and supports the representation of complex biological processes. Additionally, using various perspectives in teaching environmental issues has been shown to enhance students' vocabulary and critical thinking skills (Christenson, 2004). In short, this research emphasizes the importance of multimodal environmental texts in primary education, both in terms of content and pedagogy.

In terms of gender roles, this research reveals that textbook developers aim to highlight that sustainable living is not solely the responsibility of men or women. Although socioculturally, outdoor heavy work is traditionally seen as men's domain, in the face of increasingly adverse environmental conditions, women also play a crucial role in addressing environmental challenges. This underscores the importance of teaching students the value of collaborative efforts to create a harmonious and sustainable life. Similarly, Drake et al. (2024) stress the role of education in promoting social equality and challenging gender stereotypes. Another study by Parwati et al. (2021) further emphasizes the importance

of dismantling gender stereotypes from an early age to foster sustainable communities. Hence, these textbooks genuinely consider the ethnic and cultural diversity in Indonesia to support sustainable living.

Based on the research findings, this study has important pedagogical implications that could serve as a powerful tool for achieving sustainable living through the learning materials used by children. The pedagogical implication is that the Indonesian government's decision to integrate environmental concepts in the education curriculum represents a strategic step. However, it would be even more effective if they paid more attention to incorporating persuasive linguistic elements. This means that, in the future, the findings of this research can guide the development of education policies that better integrate environmental literacy into the curriculum. In line with this, collaboration among curriculum developers, applied linguistics experts, and publishers to create or select more inclusive and environmentally-oriented teaching materials is essential for achieving SDG 4 (Andajani et al., 2024). Therefore, these findings can be used as policy recommendations for devising strategies that not only improve children's language competencies but also foster positive attitudes.

Table 5.

Description of peace value data in the textbooks reviewed using ecovisual judgment approach and environmental literacy concept

Category of peace value	Figure	Ecovisual judgment theory	Environmental literacy
Oneself	1	Two objects represented in visual text consist of two shopping bags made from rattan and recycled materials. These shopping bags are commonly found in traditional markets, modern stores, and malls. This is because the use of these materials for shopping bags has been regulated by the government as environmentally friendly.	Ecological Behavior
	2	Four objects represented in visual text include a water bottle, food container, utensils (fork and spoon), and a reusable straw. These items are environmentally friendly as they are reusable and do not contribute to plastic waste.	Ecological knowledge
	3	Two objects represented in visual text are waste bins. One bin is for organic waste, and the other is for inorganic waste. The images aim to show the separation of easily decomposable and non-decomposable waste, which should be sorted accordingly. Additionally, the bins are distinguished by different colors and labels.	Cognitive Skill
	4	One child represented in the visual text is a disabled boy throwing away a banana peel. The banana peel is disposed of in a composting area. This visualization shows that no one, regardless of their condition, is hindered from participating in environmental conservation efforts.	Ecological Behavior
	5	Another child represented in the visual text is a girl wearing a headscarf and a hat, dressed for gardening. With a wide and cheerful smile, she is holding a tree seedling ready for planting. This visualization demonstrates that everyone, from any religion, should participate in environmental preservation by planting trees around them.	Ecological Behavior
	6	An elderly person represented in the visual text is planting a tree seedling in his backyard. He is planting the tree to help combat the drought occurring around his home. This visualization also shows that everyone, regardless of age, should and must participate in helping to preserve the environment.	Ecological Behavior
	7	Two girls are represented in the visual text, with one dressed in trendy fashion and the other in simple attire, not always following trends. The visualization depicts issues in textiles where following fashion trends can lead to accumulation of fashion waste that is difficult to decompose. In contrast, the simplicity in dressing in the other image shows using clothes according to what one owns, thus minimizing textile waste.	Ecological Knowledge
Social	8	Three participants represented in the visual text consist of one girl (in a thoughtful gesture) and two boys (one boy with glasses is reading a book while the other is writing). This visualization portrays children engaged in learning, often seeking solutions to environmental crises.	Environmental Affect
	9	Six participants are represented in this visual text. Unfortunately, the gender of the depicted children's hands cannot be clearly identified, but they come in different skin tones and hand sizes. The accompanying text clearly shows their commitment to addressing waste pollution in efforts towards sustainable living.	Ecological Behavior
	10	Four participants are represented in the visual text, consisting of two boys and two girls. They are engaged in a demonstration to address climate change.	Ecological Behavior
	11	Two participants are represented in the visual text, comprising one boy and one girl. In the image, they are seen planting two trees, with one tree already planted and another tree yet to be planted. In short, this visualization embodies the concept of greening efforts, supported by available linguistic elements.	Ecological Behavior

Table 5 presents information on 11 selected relevant texts chosen for detailed analysis. This selection was due to space limitations, which prevented the inclusion of more texts. These texts were categorized into two groups: peace within oneself and social peace. For more detailed information, it is presented as follows.

Discursive Practices in Promoting Inner Peace Values for Achieving Sustainability

Figures 1 and 2 depict findings related to discursive practices aimed at teaching the concepts of reduce and reuse, while Figures 3 and 4 are related to recycling. The purpose of presenting these topics is to encourage children to consider items that can be reused, aiming to minimize the issue of waste volume on the planet. Currently, the waste volume is estimated to range from 20 billion tons in 2017 to an estimated 46 billion tons in 2050 (Maalouf, 2022). In Indonesia, national waste production reaches 29,565,740.01 million tons per year (KLHK, 2021), consisting of household waste, plastic, and chemical waste polluting rivers, seas, and other settlements. Given these facts, it is not surprising that textbook developers are making efforts to implement sustainability character development practices.

These findings emphasize the presence of comprehensive and consistent waste literacy education in textbooks. This is supported by the measures taken by textbook developers, who present Figures 1 to 3 related to knowledge, followed by Figure 4 depicting action. Students often fail to act according to what they learn in school because they only acquire knowledge, indicating a gap between knowledge and behavior (Eleršek, 2012). In light of this, textbook developers seem to take into account this disparity to ensure that children are not only provided with knowledge but also comprehend strategic action steps to achieve sustainability.
Figure 1 depicts two basket bags commonly used by the community for storing groceries, typically made of bamboo or rattan weaving. In Indonesia, this practice is regulated by government policies in each region. For instance, in the special capital region of Jakarta, Governor Regulation No. 142 of 2019 mandates the use of environmentally friendly shopping bags in shopping centers, supermarkets, and traditional markets. These findings highlight how children may develop attitudes inclined to comply with regulations and policies to encourage environmentally friendly shopping habits.

On the other hand, the findings also promote adult practices that children can mimic to reduce waste volume. Children in primary school often imitate social interactions in their environment (Curdt-Christiansen, 2020). This is reinforced by linguistic cues such as "bringing your own shopping bag [positive social sanction with the type of veracity]". This indicates persuasive communication by conveying wise attitudes, being at peace with oneself in accepting rules that they can follow. These practices are reflected in environmental literacy texts, encouraging environmental behaviors aimed at preventing or solving environmental problems.

Figure. 1.
Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.108

Figure 2 depicts reusable food containers, including beverage bottles, food containers, drinking straws, spoons, and cups. When children bring their own containers, they set a positive example for their peers, encouraging others to follow their action and adopt positive changes in their daily habits. Moreover, it saves costs, promotes health, and reduces carbon footprint. This reflects discursive practices aimed at shaping a more environmentally conscious and responsible generation, bringing long-term benefits to all living beings on earth. This is further emphasized by the term "zero-waste equipment [positive social esteem with the tenacity type]". This implies presenting reliable, environmentally friendly, and durable items that can only be used by individuals who are at peace with themselves, patient, consistent, and accepting of circumstances to always act positively. These discursive practices are implemented by textbook developers through ecological knowledge texts aimed at shaping individuals capable of reducing or preventing waste usage, particularly plastic and styrofoam in this context.

Figure. 2.
Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.108

Furthermore, Figures 3 and 4 are related to the concept of recycling. These discursive practices are aimed at teaching children about the material cycle concept. Such practices serve not only to increase environmental awareness but also to provide practical applications in resource design and management for children (So & Chow, 2019). Guiding children to reduce environmental pollution helps minimize negative impacts since waste that is not recycled often ends up in landfills, leading to air, soil, and water pollution.

Figure 3 contains two trash bins: one pink (for organic waste) and the other orange (for inorganic waste). Each bin serves as a guide for sorting waste, an effective way to maintain environmental cleanliness. Implicitly, these discursive practices convey the message that organic waste can decompose and harm the environment if not disposed of properly, while inorganic waste cannot decompose and can also harm the environment if not disposed of properly. Hence, it is imperative to instill knowledge, attitudes, and behaviors in children for effective waste sorting. The advantages of these practices are frequently experienced by families and communities alike (Rada et al., 2016).

This idea is further reinforced through linguistic expressions presented in the discourse. The discourse includes questions like "why is sorting waste good? [positive social esteem]" - which promotes reducing disposed waste [social esteem] and accelerating the decomposition process [social esteem]. Failure to sort waste [social esteem] leads to clean waste becoming dirty [social esteem], and waste piling up and rotting [social esteem]. The method of waste sorting involves separating it according to its type: (1) organic waste such as food scraps and dry leaves is collected and can be turned into compost [social esteem], and (2) inorganic waste like cardboard, paper, and plastic can be recycled and reused [social esteem]. Let's care for the earth! [social sanction]. Reduce my waste, sustain my earth! [social esteem]. Based on the previous explanation, texts containing self-peace values in the form of clean-living attitudes realized through cognitive skill discourse significantly influence children's lifelong attitudes and behaviors toward the environment (Triyono et al., 2023). Additionally, in the findings, knowledge about recyclable paper, metal, and plastic is provided. This is aimed at reducing pressure on the natural environment and decreasing unsustainable exploitation of natural resources (Andajani et al., 2024).

Figure. 3.
Source Buku Bahasa Indonesia: Sayangi Bumi (Grade 5) p.165

Figure 4 depicts a smiling boy leaning on a stick while managing organic waste to make compost. This teaches the action of decomposing waste to make it beneficial, such as turning it into fertilizer, with a sense of happiness [positive affect]. Moreover, this finding encourages children not to see physical limitations as barriers to taking positive actions, aiming to cultivate characters of wisdom and resilience in maintaining sustainability. It is supported by linguistic expressions like "composting organic waste [positive social sanction with propriety type]". This signifies that the text promotes self-peace values such as patience, environmental care, and kindness. These values are realized through environmental behavior texts, encouraging people to take appropriate actions regarding environmental issues.

Figure. 4.
Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.108

Figures 5 and 6 are related to tree planting or the concept of greening. Discursive practices in this category are carried out in response to the deforestation conditions. Indonesia, known for its significant forest cover, has unfortunately experienced a decline in its role as the world's lungs, contributing to the mitigation of global temperature rise (Gaveau et al., 2021), despite having the second-largest forest area globally after the Amazon. Furthermore, in 2001, Indonesia had more than 50% of its land area, but unfortunately, by 2023, the country lost 292,000 hectares of primary forests (GFW, 2023). Another report indicates a loss of 32,209.24 hectares in the last 10 years (Tenri Sompa et al., 2021). This is primarily due to rapid population growth and increasing demands for agricultural land, mining, plantations, settlements, and job opportunities. Under these circumstances, it is understandable that textbook developers are taking action. Previous research has also demonstrated the effectiveness of these actions. For instance, the development of ecological literacy in forest parks has been shown to enhance practical competencies, coexistence, and biological knowledge in children (Hammarsten et al., 2019). Furthermore, the utilization of forest materials, such as sticks, in literacy teaching and learning has been emphasized as a method to foster children's connection with nature (Harwood & Collier, 2017).

Figure 5 depicts a girl engaging in outdoor activities and holding a tree to be planted. She is wearing a hat and outdoor clothing, ensuring safety. Therefore, this visual element is used to encourage children to take actions like the one shown, namely, planting trees. This is reinforced by the linguistic phrase "planting trees" [positive social sanction with the propriety type]. It means that the text promotes values like hard work, creativity, and enthusiasm. This is conveyed through the environmental behavior text type, strategically encouraging people to take the right actions regarding environmental issues.

Figure. 5.
Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.108

Figure 6 shows an elderly man planting trees in a barren area, indicated by the small trees around him, which are likely also newly planted by him. This practice aims to introduce and teach steps that can be taken to create a harmonious and green environment, thus minimizing damage and natural disasters. This is further reinforced by the available linguistic phrase, "to combat drought [negative social esteem with the abnormality type], Grandpa Sadiman plants banyan trees in areas where there are none [positive social sanction with the propriety type]. He does this by planting teak tree seedlings in his small backyard [positive social sanction with the veracity type]. Additionally, he also obtains them by grafting banyan trees [positive social sanction with the veracity type]. Since the area he planted is very large [positive social sanction with the propriety type], Grandpa Sadiman also creates a shortcut consisting of 1025 steps that he uses to climb Bukit Gendol [positive social sanction with the propriety type]. He completed the construction of these steps for a full month, working on them himself every day from morning until evening [positive social sanction with the propriety type]. Along this shortcut, he also takes the time to plant banyan trees and ornamental plants [positive social sanction with the veracity type].

Based on the previous explanation, the findings contain intrinsic values such as hard work, consistency, creativity, and diligence. Instilling these attitudes is embedded in environmental behavior texts, aiming to encourage people to take appropriate actions regarding environmental issues. In specific contexts, this practice is implemented through inspirational stories, yet it appears that there is a need for further expansion and enhancement to make it more comprehensive. Furthermore, consistent with the findings, policies integrating nature-themed literature into early childhood curricula can enhance children's knowledge and cognitive skills regarding environmental references, human autonomy with nature, and nature as a place of learning (Gultekin & Yigit Gencten, 2024). Therefore, these findings necessitate further action to support educational curricula that prioritize environmental management, conservation, and sustainable living practices.

Figure 6
Source: Buku Bahasa Indonesia: Sayangi Bumi (Grade 5), p. 151


Untuk mengatasi kekeringan, Mbah Sadiman menanam pohon beringin di lokasi-lokasi yang tidak ada tanamannya. Ia melakukannya dengan menyemai bibit pohon jati di pekarangan rumahnya yang kecil. Selain itu, ia juga mendapatkannya dengan cara mencangkok pohon beringin. Karena area yang ditanami sangat luas, Mbah Sadiman juga membuat jalan pintas berupa 1.025 anak tangga yang ia gunakan untuk mendaki ke Bukit Gendol. Ia menyelesaikan pembuatan anak tangga tersebut selama satu bulan penuh yang ia kerjakan sendirian setiap hari dari pagi hingga sore. Di sepanjang jalan pintas tersebut, ia juga sempatkan untuk menanam beringin dan tanaman-tanaman hias.

Figure 7 is related to fashion. It features two girls with distinct fashion styles. One girl opts for simple fashion, while the other follows contemporary trends, considered more stylish. In this context, it highlights knowledge about clothing that supports sustainability. Fast fashion has led to environmental degradation and resource depletion, impacting various aspects of life and biodiversity (Yang et al., 2024). Therefore, this discursive practice aims to introduce and instill attitudes in children towards sustainable fashion practices, such as reducing clothing purchases and extending clothing lifespan.

Furthermore, the practice aims to raise children's awareness of the negative impacts of environmental issues and minimize non-biodegradable textile waste. This is further reinforced by the micro-linguistic elements presented in Table 5. Based on this, the findings in this category embody values of self-peace such as wise and consistent attitudes. This is realized through the ecological knowledge text type, providing insights into various solutions to environmental issues, enabling children to better understand related ecological issues and become more aware of the importance of sustainability in their daily lives (Triyono et al., 2023).

Discursive Practices in Promoting Social Harmony Values for Achieving Sustainability

Figures 8 to 11 illustrate discursive practices aimed at instilling social values that consider multicultural and gender aspects to achieve sustainability. In essence, they promote equality and inclusion in education. Unlike other research findings, Korean ethnic textbooks in China tend to avoid discussing current environmental issues and attribute problems to dominant groups without clear explanations, highlighting the need for critical perspectives (Lee & Kang, 2023; Lee, 2023). Similarly, EFL textbooks in Japan often focus solely on technical solutions to environmental problems, overlooking the cultural values at the core of the crisis and the profound ecological insights from traditional Japanese culture (Stibbe, 2009). Therefore, these findings offer a new perspective for the development of environmental literacy, considering cultural manifestations in Indonesia.

Figure 8 depicts three school children seeking information about the climate crisis issue, one girl and two boys. The visual elements show a curly-haired boy in the middle reading with glasses, a straight-haired boy with narrow eyes writing, and a girl without a hijab who appears to be thinking. This illustrates the physical diversity of Indonesian society. Therefore, this finding suggests that addressing environmental crises requires cooperation regardless of physical appearance. This is also supported by the linguistic element "Climate Crisis" [negative social esteem with the abnormality type]. Based on this, it aims to promote positive attitudes in children to participate in creating sustainable lives by improving

Figure. 7.

Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.104

Table 5.

Fast Fashion Data

Figure 7		Slow fashion	vs	Fast Fashion
	Translation and judgment	More expensive and longer-lasting [positive social esteem with the capacity type]	Quality	Cheap and tends to be low quality [negative social esteem with the incapacity type]
		Often traditional [social esteem with the capacity type]	Production Methods	Modern [social esteem with the incapacity type]
		Eco-friendly [social esteem with the capacity type]	Environmental Issues	Risk of environmental damage [social esteem with the incapacity type]
		Small [social esteem with the normality type]	Production Scale	Large [social esteem with the normality type]
		Low with style turnover every season [social esteem with the tenacity type]	Production Volume	High with style turnover every two weeks [social esteem with the intenacity type]
		Usually employs people from the local community [social esteem with the normality type]	Worker Issues	Workers often from developing countries, paid lower wages, and work longer hours due to production quantity pursuit [social esteem with the abnormality type]
		Local fabrics that are organic, natural, and recycled materials [social esteem with the normality type]	Materials Used	Cheap and tend to be low quality [social esteem with the abnormality type]

the deteriorating environment. Thus, the text aims to instill social harmony values through cooperation and concern for both social and environmental aspects. This is realized through environmental affective text types focusing on attitudes, concerns, and future views on environmental issues.

Figure. 8.
Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.92

Figure 9
Source: Buku Bahasa Indonesia: Sayangi Bumi (Grade 5), p. 160


Sampah dapat berubah menjadi berkah apabila kita bijak dalam mengelolanya. Penanganan sampah yang baik dan benar juga akan menciptakan lingkungan yang bersih sehingga membuat hidup kita nyaman dan sehat. Hal itu dapat kita wujudkan melalui partisipasi dan peran aktif kita semua.

Figure 9 depicts six children holding hands, likely consisting of three girls and three boys. Their hands vary in skin color and size. For example, darker skin typically represents Indonesians from the eastern regions. As noted by Setyono and Widodo (2019), Indonesian textbooks emphasize diversity, including differences in ethnicity and skin color. In this context, the image promotes the idea that saving the Earth is a collective responsibility, regardless of our differences. This message is reinforced by the microlinguistic elements present, such as: "Waste can become a blessing if we manage it wisely [positive social esteem with the capacity type]. Proper waste management will create a clean environment [positive social sanction with the propriety type], making our lives comfortable and healthy [positive social esteem with the normality type]. We can achieve this through everyone's participation and role [positive social sanction with the veracity type]. The evaluation shows that these microlinguistic elements are predominantly positive judgments. This indicates that the findings are a practice of instilling values of social harmony, emphasizing togetherness and cooperation. These values are conveyed through an environmental perspective that uses evidence and knowledge to solve problems.

Figure 10 features four children: two boys and two girls. The image represents not only gender but also the Islamic faith, as one of the girls, dressed in pink, is wearing a hijab. The use of this type of clothing aligns with Islamic teachings that prescribe modest dress. Thus, the image introduces the concept of children expressing environmental concern in the public sphere, promoting cooperation regardless of differences. This message is supported by the micro-linguistic elements present in the image: The girl in a pink hijab: "Save the Earth! [positive social sanction with the propriety type]" The girl without a hijab, wearing glasses: "Save the Earth! [positive social sanction with the propriety type]" The boy in a yellow shirt and shorts: "Pause for the climate [positive social sanction with the propriety type]" The boy in long pants: "Stop pollution [positive social sanction with the propriety type]" These statements indicate that the children are concerned about the environment. The image conveys values of social peace by promoting respect for human rights, environmental awareness, and cooperation. This discursive practice is realized through environmental behavior texts that emphasize urging political or governmental institutions to take positive action for the environment.

Figure 10
Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.99

Figure. 11.
Source Buku Bahasa Indonesia: Jeda untuk Iklim (Grade 6) p.106

Figure 11 depicts a pair of children engaged in outdoor activities, specifically planting trees. The boy has finished planting his tree, and both children are smiling, showing positive affection and happiness. Meanwhile, the girl is about to plant her tree, as indicated by her holding it. This scene serves as a persuasive effort to encourage other children to take similar actions, fostering the development of practical skills and environmental awareness. This message is reinforced by the phrase "one child, one tree" [positive social sanction with the propriety type]. This indicates a discursive practice aimed at instilling social peace values in children, such as caring for living beings now and in the future. This practice is realized through environmental behavior texts that emphasize attitudes, care, and perspectives towards the environment.

Conclusion

All show that discursive practices link the concept of values to EL (explicit), life contexts, activity-based learning, and multicultural and gender equality education. They use this method to enhance students' EL skills and morality in an ethical world. Integrating ecovisual theory and values illustrates how discursive practices improve learning materials and help students understand and appreciate the environment. This particularly aims to deepen students' environmental understanding and encourage further research in this area. The findings of this research show that values of oneself include acceptance of conditions, wisdom, adherence to rules, honesty, patience, consistency, strength, hard work, creativity, enthusiasm, and kindness. These qualities help children develop mental, physical, and self-esteem. Thus, discursive practices aim to instill important values in children for a balanced, healthy, and harmonious life. Social values, on the other hand, originate from work, community, sharing, and respect for the right of others. These values are imparted to children to ensure their childhood is more peaceful and safer, allowing them to develop tolerance, empathy, social skills, mental and emotional health, and strong leadership. Furthermore, the study found all components of EL, but they were primarily based on environmental behavior, knowledge, affect, disposition, and rare cognitive components. Based on a perfect assessment, positive aspects dominated over negative ones. Additionally, social esteem was easier to determine compared to social appreciation.

This research has limitations as it overlooks engagement and graduation elements in AT when analyzing lexico-grammatical features. In this context, utilizing engagement can explore discursive practices to influence students' attitudes, encouraging them to actively learn, understand, and take action on environmental issues. Meanwhile, graduation refers to exploring how far these discursive practices contribute to achieving specific levels of understanding, skills, and attitudes among students towards the environment. Therefore, future researchers can focus on examining these aspects. Additionally, future research can concentrate on calculating the frequency of peace values, judgments, and EL. This serves as evaluation material for textbook developers to determine whether their distribution is balanced or not, guiding future improvements. Furthermore, future researchers can use the analysis approach designed by the current researchers to examine language textbooks issued by the Indonesian Ministry of Education and Culture, such as English, Arabic, Japanese, German, and Mandarin textbooks. The findings from such research will certainly contribute to generalizing the extent to which the Indonesian education curriculum supports sustainable living. Additionally, this research data analysis framework can also be used by foreign researchers to analyze language textbooks in their respective countries.

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Psychosocial and Moral Factors of Bystanders in Peer Bullying

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Abstract

The aim of our study was to explore students' bystander roles in peer bullying considering the interaction between their individual and contextual characteristics. We included social status goals (popularity, social preference and social insecurity), moral disengagement and peer support as key variables for differentiating bystander behaviour. Our sample comprised 5148 students from the 8th and 9th grades across 118 primary schools in Slovenia. Bystander roles (active and passive reinforcers, ignorants and defenders) were determined by peer nominations. Other characteristics were measured with self-report questionnaires. For each variable, we normalized students' results with regard to their classroom to define classroom norms as the context of peer bullying resulting in "low", "average" and "high" group. Students with similar individual and contextual characteristics were grouped into four clusters. The results showed that students from all clusters were present in all bystander roles, which indicates a highly complex interaction of various factors in bystander behaviour. Some educational implications are discussed.

Keywords:

Peer Bullying, Bystander Roles, Classroom Norms, Moral Disengagement, Social Goals, Peer Support, Students

Introduction

Peer bullying is a widespread phenomenon in schools. It is defined as intentional, targeted, and repetitive aggressive behavior by one or more individuals towards one or more individuals and involves an imbalance of power (Volk et al., 2017). Research indicates that on average, 20-35% of students are actively involved in it - either as perpetrators, victims, or in both roles (Espelage et al., 2013; Pečjak et al., 2021). However, this violence typically does not only involve a dyadic bully-victim relationship but often occurs in the classroom in the presence of bystanders. Peer bullying is often a means for adolescents to achieve higher social status among their peers, for which bullies require an audience. A significant proportion of students report their presence as bystanders in peer bullying incidents (63-73%, Oh & Hazler, 2009); of these, 43 to 72% appear in the role of bystanders in upper elementary grades and in secondary schools (Bradshaw et al., 2007; Waasdorp & Bradshaw, 2018).

Bystanders, as the largest social group in the classroom, have significant potential power to either reinforce or stop the aggressive behavior of peer bullies (Salmivalli et al.,

2011). However, as many as 90% of older elementary school students report that they do nothing if they witness peer bullying (Pergolizzi et al., 2009). There are various reasons for this. In situations of peer bullying, where multiple bystanders are present, diffusion of responsibility often occurs, also known as the bystander effect, where students expect another peer to intervene. Often, the perpetrators of violence are popular students with significant power, and thus, intervening as a bystander requires a lot of courage and carries the risk that the defender might become a victim themselves or worsen their social status (Pečjak et al., 2021).

Bystanders in Peer Bullying

Bystanders in peer bullying are not a homogeneous category; they appear in different roles: reinforcers of bullies (active and passive), outsiders or ignorants, and defenders (Pečjak et al., 2021; Salmivalli, 2010). Active reinforcers or assistants of the perpetrator are those who aid the bully (e.g., hold the victim, encourage the bully), while passive reinforcers are those who pay attention to the bullying (e.g., observe, record, laugh at the victim), thus reinforcing the violence. Ignorants have the potential to stop the bullying but withdraw from the situation or pretend not to notice anything. Defenders intervene in peer bullying – they try to stop it or support and comfort the victim.

Studies show that defending victims is associated with less peer bullying in schools (Salmivalli et al., 2011) and better social-emotional outcomes for victims, such as reduced anxiety, depression, and improved self-esteem (Holt & Espelage, 2007; Sainio et al., 2011). Therefore, a relevant question is how to encourage outsiders, who are the predominant majority in the classroom, including potentially passive reinforcers of the perpetrator, to stand up for the victim. The answer to this question is complex, as, in line with social-cognitive theory (Bandura, 2001) and ecological systems theory (Bronfenbrenner, 1979), it is necessary to acknowledge that bystander behavior in peer bullying is the result of complex interactions between numerous individual and contextual factors that influence students' roles.

The premise of our study is that peer bullying in schools is a multidimensional phenomenon resulting from complex interactions between the individual and psychosocial characteristics of adolescents and their classroom contexts (Alcantara et al., 2017). This also applies to the various roles of student bystanders, which were the target group in our research.

Individual and Contextual Factors in the Roles of Bystanders in Peer Bullying

Among individual factors in bystanders of peer bullying, studies have most commonly examined moral disengagement, empathy, social goals, social status, perceived peer support, and self-efficacy; while among contextual factors, classroom norms, attitudes towards bullying, and school climate have been investigated (Jenkins & Tennant, 2022; Pozzoli & Gini, 2010; Pronk et al., 2020; Salmivalli et al., 2011; Smith, 2014). In the next section, we provide a detailed presentation of the factors included in our study – moral disengagement, social goals, social status insecurity, and perceived peer support.

Moral Disengagement in Peer Bullying Bystanders

Moral disengagement is defined as a set of socio-cognitive mechanisms that allow individuals to cognitively distance themselves from their own actions and to avoid feelings of shame, guilt, or negative self-esteem that typically arise when they violate their own moral standards (Bandura, 1999). According to Bandura (2002), the most common mechanisms include moral justification (where individuals justify their immoral behavior with socially acceptable reasons, such as worthy goals or good/moral intentions), diffusion or displacement of responsibility (where individuals shift responsibility for immoral behavior to the group or share it with peers), and disregarding or minimizing the injurious effects of perpetrators and dehumanizing victims (by diminishing their human or equal value or by blaming the victim).

There is ample evidence that moral disengagement is one of the most significant individual factors explaining bystander behavior in bullying. Studies indicate that defenders and outsiders have lower levels of moral disengagement compared to reinforcers of the bully or bullies themselves. Defenders feel more responsible for providing help than ignorants and also differ from them in feeling more self-efficacious in providing assistance or support to the victim (Pozzoli et al., 2012; Oberman, 2011; Thornberg & Jungert, 2013; Thornberg et al., 2015).

Social Goals of Popularity and Preference, Social Status Insecurity, and the Roles of Bystanders

For adolescents, their social status among peers, or where they stand in the social hierarchy of the classroom as a student, is crucial. Therefore, understanding social goals that help adolescents achieve this status is important. One common way for students to gain and maintain a higher social position in the classroom social hierarchy is through aggression, manifested in peer bullying (Pouwels et al., 2018). Students differ in their social goals. For some, it is primarily important to be popular among peers, as popularity indicates the attention and dominance of the student over peers. On the other hand, some adolescents are more focused on relationship quality and prefer being liked and well accepted. From this perspective, we can talk about two types of social

goals: popularity and social preference goals (e.g., Cillessen & Marks, 2011; Košir et al., 2021).

In previous research, high social goals related to popularity have been found to be more associated with aggressive behavior among students, while high social preference goals have been linked to prosocial behavior and a lower level of relational aggression (Košir et al., 2021; Li & Wright, 2014; Pouwels et al., 2019), or have been found unrelated to bullying behavior (Garandeau & Lansu, 2019). Additionally, studies show that adolescents' high peer status is correlated with bystander behavior – positively with defending and negatively with ignoring bullying situations (e.g., Pronk et al., 2020; Yang & Gao, 2022).

By competition for better peer status or maintaining it, adolescents may experience concerns or uncertainties about their social standing among peers, known as social status insecurity. This is especially true for students with high popularity goals. They worry that their status in the classroom is not as high as they would like or that it is threatened by their peers, leading them to use aggressive strategies to defend or promote their status (Košir et al., 2021; Long & Li, 2019; Zhang et al., 2022). Regarding the association between social status insecurity and bystander roles, studies indicate that insecurity, in combination with high popularity goals as a moderating variable, increases the likelihood of taking on the role of a defender, while it is not associated with the role of ignorants (Zhang et al., 2022).

Perceived Peer Support

Good relationships or perceived social support from peers can be considered indicators of students' social and emotional well-being in the classroom (Alcantara et al., 2017). Vaux (1988) highlights three interrelated elements of social support: sources and forms of social support, and individual's subjective perception of social support. Sources of social support are the social networks that individuals turn to for help and support (or that provide help to them spontaneously). Forms of social support are specific behaviors of assistance to the individual, either spontaneously or upon their request. Perceived peer support is the assessment of the presence and quality of this support, primarily expressed through emotional aspects such as closeness, care, and acceptance from peers (Hlebec & Kogovšek, 2003).

Studies show that peer social support can act as a protective factor against victimization of individual students in the classroom and increase the prosocial orientation of bystanders (Alcantara et al., 2017). In this regard, Ewans & Smokowski (2015) explain that positive peer relationships influence bystander behavior in peer bullying in two ways. Firstly, defenders of the victim serve as role models for other bystanders, from whom they can learn prosocial behavior. And secondly, students see that social support derived from the social network to which they belong can reduce the fear of becoming a victim themselves if they were to defend the victim against the bully. On the other hand, they found weak social ties among reinforcers, which leads them to feel that they must repeat bullying behavior to belong to a social network.

Classroom Norms

Individual factors of the bystander interact with the social context of the classroom, specifically with classroom norms regarding peer bullying. Classroom norms can be defined as consensus-determined standards of behavior that describe which behaviors are acceptable and which are not in a given class. We distinguish between injunctive norms, which refer to what students in a classroom approve and disapprove of (what ought to be done), and descriptive norms, which refer to how students actually behave in the classroom (Veenstra et al., 2018).

Students in Slovenian schools are together in the same social group—the classroom—day after day for several years, sometimes for all nine years of primary shool, during which they influence each other. Through this mutual influence, classroom norms gradually develop.

Research on the relationship between norms and the role of bystanders does not yield unequivocal results. The study by Salmivalli and Voeten (2004) shows that injunctive classroom norms against peer bullying (i.e., disapproval of encouraging the bully and approval of defending the victim) were positively associated with defending the victim among 6th-grade students, but not among younger students. Similarly, Lucas-Molina et al. (2018) found that antibullying classroom norms were associated with greater defending. On the other hand, the study by Pozzoli et al. (2012) indicates that antibullying classroom norms predict only ignoring the bullying and not defending.

The Aim of Our Study

In the last 15 years, the focus of research on peer bullying has shifted from examining the individual characteristics of active participants (perpetrators and victims) to investigating the social context in which peer bullying occurs, as peer bullying is most often a public event. An important part of this context is also peers – bystanders, who play a critical role in intervening (Lambe et al., 2019). These bystanders appear in various roles – some siding with the perpetrator, others with the student experiencing bullying, and others ignoring the situation.

Therefore, the goal of the current study was to investigate the prevalence of roles of student bystanders in peer bullying from the perspective of

the interaction of their individual and contextual characteristics. In this regard, we focused on individual characteristics such as social status goals (popularity, social preference), and social status insecurity, as these goals are related to behavioral strategies to achieve them. Based on findings from previous studies, we first hypothesized that students with more expressed popularity goals will more likely appear in the role of active and passive reinforcers, and those with more expressed social preference goals in the role of defenders (Košir et al., 2021; Yang & Gao, 2022).

Furthermore, we were interested in perceived support and moral disengagement in individual bystander roles. Our second hypothesis was that students with lower moral disengagement would more likely be in the role of defenders and less likely in the role of reinforcers (Alcantara et al., 2017; Lucas-Molina et al., 2018; Thornberg et al., 2022). Regarding the relationship between perceived support and the roles of bystanders, studies do not yield consistent results: some indicate a positive correlation with the role of victim defender (e.g., Alcantara et al., 2017; Lucas-Molina et al., 2018), while others indicate a positive correlation with the role of bully reinforcer (Salmivalli et al., 1997; Vaillancourt et al., 2003).

In our study, we measured descriptive norms among students by first determining the norms for each variable at the class level students belong to. Then, for each student, we assessed whether they deviated below, above, or within these classroom norms.

Due to the complex nature of the interplay between individual and contextual factors in each individual, we chose the person-centered approach methodology, which can help understanding the heterogeneity of bystander responses when witnessing peer bullying. Therefore, we divided bystanders into different clusters/groups, where students with similar individual and contextual characteristics were grouped together within each cluster.

Method

Participants

The initial sample comprised a total of 6786 students. Following data screening to eliminate students with missing relevant data, 5148 students remained. Thus, the analyzed sample consists of 5148 students from the 8th and 9th grades across 118 primary schools in Slovenia. Of these, 47.3% were boys and 47.3% were girls. Gender information was unavailable for 5.4% of students. The average age of the students was 13.43 years (*SD* = 0.64). While the sample was convenience-based, it was notably large, encompassing approximately 12% of all Slovenian students within this age group, and represented schools from all regions of Slovenia.

Instruments

The roles of bystanders in the classroom were determined using peer nominations. The initial question was: "Who among your classmates in the classroom and online is the one who... joins the bully (e.g., starts bullying others themselves) for active reinforcers; ... agrees with such behavior without joining the bully (e.g., laughs)? for passive reinforcers; ... stands up for the victim (e.g., stops the bully, reports to teachers)? for defenders; and ... does nothing when others bully classmates? for ignorants. For each description, students had six lines to name their classmates, they could also include themselves.

To measure moral disengagement, we utilized the Moral Disengagement in Peer Victimization Scale (Thornberg et al., 2019). The scale consists of 18 items (e.g., "If you say mean things about a classmate behind their back, it's okay because they probably won't notice anyway."; "If you can't be like everybody else, it is your own fault if you get bullied"), and students responded on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), considering their classmates in the classroom and online. Confirmatory factor analysis (CFA) conducted on our sample of students confirmed a one-factor structure (CFI = 0.938, TLI = 0.927, RMSEA = 0.048, and SRMR = 0.035), with a Cronbach's α reliability coefficient of 0.85. A higher score indicates greater moral disengagement or a lower level of morality.

We employed the questions proposed by Li and Wright (2014) for popularity and social preference goals and for social status insecurity to measure two social goals: popularity goals with six items (e.g., "I want to be popular among my classmates.") and social preference goals with five items (e.g., "I want to be well-liked by my classmates."), along with social status

Table 1
Sample characteristics

Grade	Number of all students	Number of students with complete data	Proportion of students with complete data	Number of boys (B)	Number of girls (G)	B/G
8	3403	2460	72.29%	1589	1606	0.99
9	3383	2688	79.46%	1621	1605	1.01
Total	6786	5148	75.86%	3210 (47.3%)	3211 (47.3%)	0.999

insecurity with six items (e.g., "I feel that my social status in the class is threatened."). Students responded on a 5-point Likert scale (1-never, 5-all the time). Confirmatory factor analysis (CFA) conducted on our sample confirmed the original three-factor structure of the questionnaire (CFI = 0.928, TLI = 0.910, RMSEA = 0.068, SRMR = 0.062); individual scales demonstrated good/acceptable reliability (α for popularity goals was 0.87, for social preference goals 0.69, and for social status insecurity 0.83).

Peer support was assessed using the Perceived peer support scale from the Classroom Life Instruments (Johnson et al., 1983) with 5 items (e.g., "My classmates really care about me."). Students responded on a 5-point Likert scale (1-never true, 5-always true). In our sample, a one-factor structure of the scale was confirmed (CFA: CF = 0.998, TLI = 0.995, RMSEA = 0.034, SRMR = 0.010) with good reliability (α = 0.87).

Data Collection

All primary schools in Slovenia were invited to participate in the study. A total of 138 schools responded to the invitation. Once the schools agreed to participate, we prepared an informal parental consent form and requested parents or guardians to provide consent for their children's participation in the study. After collecting parental consent forms, we retained only those students in the sample for whom at least 90% of students in each class had provided consent. Consequently, the final sample comprised 118 schools. Data collection was facilitated by school counselors, who were provided with detailed instructions for conducting the study. Participants completed the questionnaires in paper-pencil format during school hours, taking approximately 45 minutes. Participation in the study was voluntary and anonymous. Data collection took place between October and December 2022. School counselors and teachers were provided with feedback based on the study findings, along with a video lecture containing guidelines on preventing and responding to bullying. The study received approval from the Institutional Research Ethics Committee.

Data on the roles of bystanders were collected using peer nominations – all students in a particular class reported which of their classmates fit a specific description (active or passive reinforcer, ignorant, or defender). Past research indicates that peer nominations are more reliable for determining roles in peer bullying than self-report measures, as the likelihood of measurement errors is reduced due to a larger number of evaluators (Bouman et al., 2012).

Data Analysis

Data analysis was conducted using Python, leveraging several libraries for data manipulation, statistical analysis, and visualization. Pandas was used for data cleaning, manipulation, and normalization processes. NumPy was employed for numerical operations, including calculating Euclidean distances between student profiles. SciPy was utilized for additional statistical analysis and cluster validation techniques. Statsmodels was applied for advanced statistical modeling and hypothesis testing. NetworkX was used to visualize the similarity matrix and clustering results as a network structure, aiding in understanding the relationships between student profiles. Matplotlib was utilized for visualizing data distributions, dendrograms, and cluster formations.

For each variable, individual students' results were normalized at the classroom level to account for the social context inherent within each classroom. This normalization involved centering each student's score by subtracting the mean value of their classroom and then dividing by the standard deviation of that classroom. The resulting standardized scores categorized students into three distinct groups for each variable: "low" (assigned a value of -1), where the student's score was more than one standard deviation below the classroom mean; "average" (assigned a value of 0), where the score fell within one standard deviation of the classroom mean; and "high" (assigned a value of 1), where the score was more than one standard deviation above the classroom mean.

The processed variables, which indicated whether a particular student was within, below, or above the "norm" of the classroom for each variable, were subsequently used to create student profiles. Each student was assigned a five-dimensional vector, denoted as pi for the i-th student, where each dimension corresponded to one of the categorized variables with values of -1, 0, or 1. To assess the similarity between individual pairs of students, we calculated the Euclidean distance between their vectors using these standardized values. Given that the profile values are limited to -1, 0, or 1, the Euclidean distances were further normalized to fall within a unit interval between 0 and 1. This normalization was achieved using the factor 1⁄(2√5), ensuring that the distance dij between the i-th and j-th profiles ranges appropriately. A distance of 0 signifies that the profiles are identical, while a distance of 1 represents the maximum possible dissimilarity between profiles. Based on these calculations, a similarity matrix was constructed where each ij-th element represents the degree of similarity between the profiles of the i-th and j-th students. We then used this matrix to cluster students into groups according to the similarity of their profiles, employing a hierarchical clustering method with Ward's linkage to create the dendrogram (Markovič et al., 2019). The Ward method minimizes the total within-cluster variance, progressively merging individual profiles or existing clusters into larger groups based on

their mutual similarity until all profiles are combined into one or more distinct clusters (Chander & Vijaya, 2021). The goal was to segment the students into well-defined groups, achieving a balance that avoids excessive fragmentation of profiles while preserving a broad representation of student characteristics within each cluster.

Results

Normalization of Students Within the Classroom and Descriptive Statistics

Table 2

The proportion of students in each group after normalization and mean values of included variables

vari-able	Low group		Average group		High group	
	%	*M (SD)*	%	*M (SD)*	%	*M (SD)*
MD	10.41	1.01 (0.02)	75.66	1.78 (0.46)	13.93	3.76 (0.87)
SG-pop	17.11	1.26 (0.19)	64.18	2.40 (0.45)	18.71	3.77 (0.43)
SG-pref	15.40	2.45 (0.60)	73.50	4.08 (0.47)	11.09	5.00 (0.00)
SIS	15.42	1.09 (0.10)	69.85	2.21 (0.53)	14.72	3.91 (0.48)
SS	19.11	1.88 (0.45)	65.87	3.47 (0.49)	15.02	4.64 (0.23)

Note. MD – moral disegagement; SG-pop – popularity social goals; SG-pref – preference social goals; SIS – social insecurity status; SS – social support; M – mean; SD – standard deviation

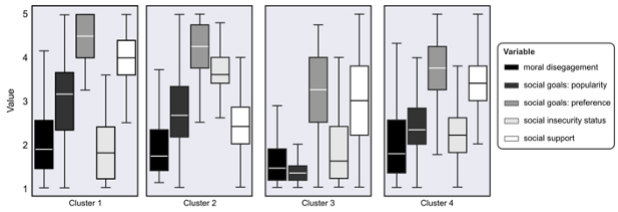
The results in Table 2 show that most students (66 – 76%) were categorized as "average" across all variables, with a smaller percentage—ranging from 11 to 19 percent—classified as "high", and 10 to 19 percent classified as "low". Students in the "low" group had the lowest average values on all examined variables, slightly higher average values were observed in the "average" group, and the highest values were found in the "high" group. The largest proportion of students in the low group was found in social support, while the smallest proportion was found in moral disengagement. In the high group, the largest proportion of students was found in social goals-popularity, while the smallest proportion was in social preference goals. The largest variability in the data was evident for social preference goals in the "low" group, in the "average" group regarding social insecurity, and in the "high" group concerning moral disengagement.

Psychosocial Characteristics of Students in Individual Clusters

First, we present the results of the cluster analysis based on aggregated similarities between different characteristics which produced four distinct student clusters. Cluster 4 comprises the largest proportion of students (2,076 students, 40.3%), followed by Cluster 2 (1,394 students, 27.1%). Cluster 3 has a smaller representation (906 students, 17.6%), and Cluster 1 contains the fewest students (772 students, 15.0%). Figure 1 displays the boxplots depicting the distribution of included variables for the students in each cluster.

Figure 1

Boxplots illustrating the distributions of included variables for each cluster



Note. The box represents the interquartile range (IQR), the horizontal line within the box indicates the median, and the upper and lower whiskers represent the maximum and minimum data points within 1.5 times the IQR from the upper and lower quartiles, respectively.

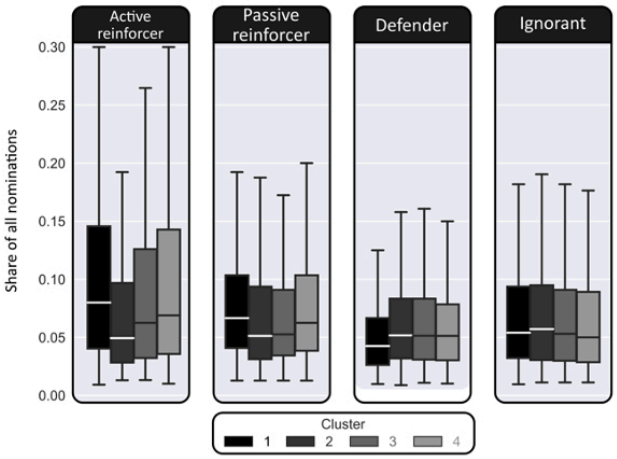
In the smallest cluster regarding the number of students - Cluster 1, students exhibit low moral disengagement, moderate popularity goals, and very high preference goals. However, these students also report low insecurity regarding their own social status and high perceived peer support. Cluster 2 comprises students with low moral disengagement, moderate popularity goals, and high preference goals. These students also demonstrate high insecurity concerning their social status and report the moderate peer support among all clusters. Cluster 3 consists of students with low moral disengagement (the lowest among all clusters), low popularity goals, and moderate social preference goals. These students show low social insecurity (the lowest among all clusters) and moderate perceived peer support. Cluster 4 is the largest cluster composed of students with low moral disengagement, moderate popularity goals, and simultaneously high social preference goals. They exhibit moderate perceived social status insecurity and moderate perceived peer support.

Representation of Students from Individual Clusters in Bystander Roles

To address the question of how different roles of student bystanders are represented within various clusters, we first computed the share of all nominations each student has received within their classroom. Since students in a classroom assume various roles, we further examined the share of nominations that individuals of specific role types received within each cluster. Figure 3 presents the results of this analysis as a boxplot, displaying the distribution of these shares within each cluster for students associated with specific role types and table 3 the differences between clusters regarding the bystanders role.

Figure 2

Distribution of Bystander Role Nominations Across Student Clusters.



Note. Each panel represents one bystander role, displaying the distribution across Clusters 1 through 4 indicated by different shades of gray. The boxplots show the median, interquartile range, and range of the shares, highlighting variations in role adoption across clusters.

Table 3

Differences between clusters with regard to bystander roles

Role	Cluster x (*M*)	Cluster y (*M*)	*p*-value
Active Reinforcer	1 (0.101)	2 (0.078)	<0.001***
	1 (0.101)	3 (0.091)	0.002**
	1 (0.101)	4 (0.096)	0.022*
	2 (0.078)	3 (0.091)	0.004**
	2 (0.078)	4 (0.096)	<0.001***
	3 (0.091)	4 (0.096)	0.073
Passive reinforcer	1 (0.081)	2 (0.069)	<0.001***
	1 (0.081)	3 (0.071)	<0.001***
	1 (0.081)	4 (0.077)	0.071
	2 (0.069)	3 (0.071)	0.167
	2 (0.069)	4 (0.077)	<0.001***
	3 (0.071)	4 (0.077)	<0.001***
Defender	1 (0.070)	2 (0.071)	0.389
	1 (0.070)	3 (0.068)	0.252
	1 (0.070)	4 (0.067)	0.018*
	2 (0.071)	3 (0.068)	0.211
	2 (0.071)	4 (0.067)	0.029*
	3 (0.068)	4 (0.067)	0.146
Ignorant	1 (0.052)	2 (0.062)	<0.001***
	1 (0.052)	3 (0.062)	<0.001***
	1 (0.052)	4 (0.059)	<0.001***
	2 (0.062)	3 (0.062)	0.401
	2 (0.062)	4 (0.077)	0.092
	3 (0.062)	4 (0.077)	0.131

From Figure 2 and Table 3, it is apparent that students from all clusters were present in all groups. However, the proportions of students from different clusters in bystander roles differ significantly. A significantly larger proportion of students from Cluster 1 received peer nominations in the role of active reinforcers compared to the other three clusters (10.1% vs. 7.8%, 9.1%, and 9.6%; $p < .05$). In the role of passive reinforcers, students from Clusters 1 and 4 received a significantly larger proportion of peer nominations compared to Clusters 2 and 3 (8.1% and 7.7% vs. 7.1% and 7.1%). There were practically no significant differences between clusters in the role of defenders. Minor differences, significant at the $p = 0.05$ level, were observed between Clusters C1-C4 (7.0% vs. 6.7%) and C2-C4 (7.1% vs. 6.7%). Slightly more students in Clusters 1 and 2 were assigned this role compared to Cluster 4. In the role of ignorants, students from Cluster 1 were significantly less nominated compared to students from the other three clusters (5.2% vs. 6.9%, 7.1%, and 7.7%).

Discussion

The aim of the study was to explore the interactive effects of certain individual and contextual factors in determining the roles of student bystanders in peer bullying since they present a dominant group in the classroom with substantial potential power—either for preventing/reducing or maintaining/promoting such bullying (Lambe et al., 2019). Therefore, understanding the factors that determine the roles of bystanders can be helpful in planning interventions in this area.

Among students' individual factors, we investigated the role of moral disengagement and students' social goals; among the contextual factors, we explored social status insecurity and perceived peer support. Both contextual factors are often studied as individual characteristics of students, although they typically reflect classroom dynamics (Košir, 2023). Thus, the level of perceived peer support and social status insecurity are not stable individual traits but are largely influenced by classroom characteristics or the type of feedback students receive from their peers within the classroom.

All variables included in the study were normalized among students, placing them within the context of classroom norms. Classroom norms represent the collective beliefs of all students in the classroom, regulating behavior also in peer bullying situations. As our results indicate, between two-thirds and three-quarters of the students were categorized as "average" across all variables; however, 10-20% of students fell into the low or high groups in individual variables (see Table 2). Of particular interest are the data on the largest and smallest proportions of students in both extreme groups, as these can act either as protective or risk factors. Nearly one-fifth of all students reported significantly lower social support compared to the

majority of their peers, which can be a risk factor for victimization (Koračin et al., 2023; Sainio et al., 2011). Conversely, it is interesting that in the high group, the largest proportion of students (19%) deviated from classroom norms in the pursuit of popularity, which can be a risk factor for peer bullying. Studies indicate that students often use aggressive strategies to achieve greater popularity (Garandeau, 2014; Koračin et al., 2023). On the other hand, in the high group, the smallest proportion of students were focused on social preference goals, which direct individuals towards more prosocial behaviors among peers, potentially resulting in more support and assistance for victimized students in peer bullying situations (Wright et al., 2012).

Psychosocial Characteristics of Students in Clusters

An overview of the psychosocial characteristics of students in clusters reveals certain commonalities as well as some differences among them (see Figure 2). Across all clusters, students exhibit low moral disengagement. This suggests that students in all clusters recognize that aggressive behavior towards peers is morally questionable. However, they may use mechanisms of moral disengagement to distance themselves from such behavior and consequently prevent negative self-evaluation when they respond inappropriately as bystanders of peer bullying (Killer et al., 2019).

Similarities can also be found among individual clusters. Cluster 1 and Cluster 2 exhibit fairly similar characteristics. Both share low moral disengagement along with high expressions of social preference goals and moderate expressions of social popularity goals. The differences between them appear to lie in their perceptions of social status insecurity and social support. Students in Cluster 1 have low sense of social insecurity and high perceived social support. In contrast, students in Cluster 2 experience high levels of social insecurity, associated with feelings of anxiety and fear regarding their social status, which may lead them to more frequently employ aggressive strategies to defend their social position (Košir et al., 2021; Long & Li, 2019; Sijtsema et al., 2009).

Furthermore, Clusters 1, 2, and 4 are similar in the expression of social goals: all three exhibit high social preference goals and moderate popularity goals. This indicates that peer approval is highly important to them, and in seeking desired social status (even through peer bullying), they do not want to lose peer support (Sijtsema et al., 2020).

Regarding social support, students in Clusters 2, 3, and 4 are similar with moderate perceived peer support, unlike Cluster 1 where students report high peer support.

Representation of Clusters in Bystander Roles

The central research question focused on how students from different clusters are represented in bystander roles in peer bullying.

The first general finding based on empirical results is that students from all clusters appear in all bystander roles. This demonstrates that the variables included in the study are just some of the numerous factors determining which role an individual will take as a bystander. The behavioral responses of bystanders to peer bullying thus result from a highly complex interaction of various factors, as indicated by other studies (e.g., Jenkins & Tennant, 2022; Košir et al., 2020; Lambe et al., 2019; van der Ploeg et al., 2017)

Among active reinforcers of bullies, peers nominated students from Cluster 1 significantly more often than students from other clusters, whereas among passive reinforcers, peers nominated classmates from Clusters 1 and 4 more frequently compared to the remaining two clusters. Students from both mentioned clusters exhibit low moral disengagement, indicating well-developed moral cognition consistent with Rest's cognitive-developmental model of morality (1983), as they recognize the inappropriateness of their behavior but do not necessarily reflect this awareness in their actions. This discrepancy may stem from their social goals: both clusters show moderate popularity goals and high preference goals, contrary to findings in some prior studies (Košir et al., 2021; Yang & Gao, 2022). This could also result from the interconnectedness between these goal types, suggesting that individuals simultaneously strive for popularity and express a need for preference, maintaining affiliation and relationships with others (Wright, 2012). Our findings align with studies indicating that adolescents aiming for specific peer-group status often pursue both popularity and preference goals, avoiding losing support from influential peers (Sijtsema et al., 2012, 2020). Those with higher expression of both goals are more likely to engage in aggressive behaviour, which is in line with our first hypothesis and previous studies (e.g., Cillessen et al., 2014; Košir et al., 2021). Furthermore, we found that students from Cluster 1 experience high and those from Cluster 4 moderate peer social support, which is in line with the findings that adolescents with relatively high peer support are more likely to engage in or reinforce bullying behaviors (Salmivalli et al., 1997; Vaillancourt et al., 2003).

Peers significantly less frequently nominated students from Cluster 1 as ignorants compared to students from the other three clusters. Research emphasizes that the non-response or ignoring of peer bullying by bystanders should always be viewed in the specific peer context (Salmivalli, 2010; Yang & Gao, 2022). It seems that the factors influencing why bystanders ignore observed peer bullying are the most diverse

among all bystander roles. For instance, if bullies are popular among their peers, protecting victimized students may pose a risk of losing one's own social status (Garandeau et al., 2022). This means that even though bystanders may recognize peer bullying as wrong or sympathize with the victim, lacking sufficient social status could potentially result in negative consequences for defending the victim or even make them the next target. Consequently, bystanders may remain passive instead of intervening to stop the witnessed peer bullying (Thornberg & Jungert, 2013).

There is practically no difference in the representation of students from different clusters in the role of defenders of victims, which is not in line with our second hypothesis. The proportions of students in this role range from a minimum of 6.7% in Cluster 4, through 6.8% in Cluster 3 and 7.0% in Cluster 1, to a maximum of 7.1% in Cluster 2. This again highlights the diversity of reasons why someone intervenes to defend a victimized peer. Common to students in Clusters 1 and 2 is their high expression of social preference goals coupled with high or moderate social support, aligning with previous findings on these constructs (e.g., Cillessen & Mayeux, 2004; Kiefer et al., 2015). This indicates that students who are more inclined towards others possess higher social capital, manifested as greater perceived social support from peers. These students feel secure enough to confront the aggressor or defend the victim, knowing that many peers are on their side and can provide support or protection (Pozzoli & Gini, 2010).

Limitations of the Study and Educational Implications

Through our study, we have demonstrated that the adoption of specific bystander roles is a result of the interactive effects of various factors, incorporating five key predictors identified in previous studies as significant in predicting student responses as bystanders of peer bullying. Despite the varied characteristics of students across different profiles, our findings indicate that these variables inadequately explain certain roles, particularly ignorants and defenders. This suggests that the outcomes—namely, bystander roles—are the product of the interaction of numerous variables (both individual and contextual), highlighting the need for future development and testing of more complex models.

An important contribution of our study is in the enhanced ecological validity of empirical results achieved through our data processing approach, wherein peer nominations of bystander roles were normalized against classroom norms. We also addressed a gap in the literature, as we have not identified any studies that examine the role of contextual factors in the age group of students from our sample, nor studies that consider the fact that these students had been together throughout their entire primary education, spanning seven to eight years. During this period, classroom norms likely became well-established, potentially contributing to greater stability in all student roles in peer bullying, including those of bystanders. In addition to individual characteristics, the context (i.e., classroom norms) also influences the bystander's response or non-response to peer bullying.

In our study, moral disengagement did not play a significant discriminatory role in determining bystander roles, as all clusters of students exhibited low moral disengagement. This suggests that students, in line with the social-cognitive model (Rest, 1983), are morally sensitive and capable of moral judgment—they recognize bullying as unacceptable and understand how they should respond to it, yet they do not always act accordingly in specific situations. Therefore, it is crucial for teachers to engage in discussions with students not only about the unacceptability of bullying but also to encourage moral reasoning in their responses to specific situations. Teachers should promote students' moral motivation, for instance, by supporting students who uphold their moral values and behave morally—such as defending victims—by fostering support from both teachers and peers.

It would be beneficial to organize classroom sessions where teachers engage with students in discussions about achieving preference and popularity goals in ways that are more acceptable and do not involve peer bullying. This approach aims to guide students in developing prosocial behaviors and making morally sound decisions in their interactions.

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Does Primary School Teachers' Resilience Have a Correlation With Students' Reading Comprehension Skills

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Abstract

The psychological resilience of teachers refers to their capacity to cope with the challenges teachers face and their ability to prevent burnout. Teachers' psychological resilience can help them teach students more effectively and maintain their profession in the long term. To date, studies on teacher resilience have generally focused on teachers' characteristics, socialization, and behavior. However, very few studies investigate teacher resilience and its reflections on education through the relationship between teachers' resilience, students' transformation of educational behaviors into skills, and reading comprehension skills. Henderson and Milsteins' study (2003) suggests that if teachers, who are the main source of role models in education, lack resilience, it is not a realistic expectation for students to be educationally resilient and indirectly demonstrate educational skills. So this study investigated the relationships between teachers' resilience and students' reading comprehension skills. This study was designed with the relational survey model, one of the quantitative research methods. The relationship between primary school students and their teachers was investigated. Numerical quantities representing the universe were calculated to question the existence of the relationship. In this regard, a total of 761 students and their teachers from the 2nd, 3rd, and 4th grades of primary school constitute the participants of the research. A total of 31 classes and their teachers from public and private primary schools were involved in the process. This study found a positive but low-level relationship between teachers' professional resilience and their students' reading comprehension skills. While teacher resilience contributes to students' reading comprehension, its impact is relatively limited, suggesting that other factors also play a significant role in students' academic success.

Keywords:

Resilience, Reading Comprehension, Teacher-Student Relationship, Primary School

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Introduction

Job attrition levels can have significant impacts on the physical and psychological health of employees (Seidler et al., 2014). Every profession has its own unique challenges, stressors, and working conditions. These work conditions can directly affect employees' success at work (Beehr & Newman, 1978; Judge et al.,2001; Rosenholtz & Simpson, 1990). Especially in professions with high attrition levels, employees' job satisfaction, motivation, and performance may be negatively affected (Maslach et al., 2001).

Teaching is one of the professions with a high level of attrition. (Kyriacou, 2001; Skaalvik & Skaalvik, 2011). In the United States, teacher attrition rates vary, according to data collected by the National Center for Education Statistics (NCES). The attrition rate, which was 5.1% in 1992, increased to 8.4% in 2008. In England, according to data published by the Office for National Statistics (ONS), the teacher attrition rate was recorded as 8.7% in the 2018-2019 academic year. In a study conducted by the Australian Council for Educational Research (ACER) in Australia, it was stated that the teacher attrition rate was approximately 8-10%. In Canada, according to data from the Council of Ministers of Education (CMEC), teacher attrition rates vary by region and province but are generally between 5-8%. High teacher attrition rates in these countries highlight the importance of teacher resilience. Accordingly, in recent years, teachers' resilience against attrition has begun to be investigated (Beltman et al., 2011; Beltman, 2020; Drew & Sosnowski, 2019; Liu & Chu, 2022; Mullen et al., 2021). Teachers have to cope with many factors such as the difficulties they encounter in the education process, relations with students (Frenzel et al., 2021), and classroom management (Hettinger et al., 2021). Teaching brings with it responsibilities such as not only transferring knowledge but also guiding students and contributing to their emotional and social development. These responsibilities can increase teacher attrition levels (Carroll et al., 2022).

However, teachers' resilience and how they respond to these challenges is an important factor that enables them to be successful in their profession. It includes characteristics such as resilience, ability to cope with stress, problem-solving skills, and emotional intelligence. These skills enable teachers to deal with challenging situations more effectively and can reduce attrition levels (Gu & Day, 2013; Skaalvik & Skaalvik, 2011)

Teachers' Resilience

Teachers, the practitioners of education, play an important role in the quality of education and especially in the academic success of students (Rowan et al., 1997). Since the teacher is an individual, it is normal to be affected by psychological situations. One of these psychological conditions is resilience. Teacher resilience is the capacity of teachers to effectively teach students and maintain their professional development, despite the difficulties in their professional lives (Skaalvik & Skaalvik, 2011). Teacher resilience is defined by Maddi (2004) as "the set of cognitive, emotional, and behavioral strategies that an individual uses to minimize negative outcomes and maximize positive outcomes in a stressful and demanding environment.

A teacher's ability to continue teaching in the best possible way depends on his/her endurance (Gu & Day, 2013). The purpose of this study is to understand whether there is a potential relationship between the professional resilience of primary school teachers and students' reading comprehension skills. It is aimed to reveal possible interconnections to understand how teacher professional resilience may or may not affect student success. It is known that the teacher variable is effective in predicting student success (Akbari & Allvar, 2010; Sanders et al., 1997). Revealing the relationship, if any, between a teacher's professional resilience, and reading comprehension skills, and determining its level can guide the development of teacher training and support programs. To improve the quality of education, it is important to evaluate teachers' professional resilience and student success together. Based on the limited number of studies conducted on this subject, it is aimed to present new perspectives by filling the knowledge gap in this field.

Reading Comprehension Skills

The ultimate goal of education is to transform the targeted learning outcomes into outputs. Learning outcomes may sometimes not be directly observable and measurable because some skills and understandings involve internal and abstract processes (Biggs & Tang, 2011). This means that it is difficult to provide concrete data for measurement and observation. Therefore, the assessment of learning outcomes usually requires various indirect measurement methods (Black & Wiliam, 1998; Shute, 2008). Today, academic achievement measurement tools are mostly based on written materials. In order for students to demonstrate what they have learned, they need to read and understand the questions in academic achievement tests. This is a critical factor in terms of the validity of the tests because understanding the content of the tests is necessary for them to accurately reflect students' knowledge and skills (Messick, 1994). In addition, question comprehension ability is an important variable that affects students' performance and can affect the accuracy of test results (Wiliam, 2011). Therefore, it is important to consider students' ability to understand the questions correctly in test design and evaluation process. In

addition, most of the teaching materials used in the educational processes for academic success are based on written materials (Doyle, 1983). In short, in order for the student to achieve and demonstrate academic success, it is necessary for the student to be competent and have reading comprehension skills. Reading comprehension skills, which have become a prerequisite for students to be successful in education, are the key to lifelong learning and development (Güneş, 2011).

Reading comprehension is one of the main factors that form the basis of learning activities. Many studies in the literature also emphasize the relationship between reading comprehension skills and academic success (Ateş, 2008; Kızgın & Baştuğ, 2020). Studies that have found that reading comprehension skills have a significant relationship with students' success in mathematics (Göktaş & Gürbüztürk, 2012), science (Bayat et al., 2014) and social studies (Keskin & Baştuğ, 2010) courses can be cited as examples of this situation. The fact that reading comprehension is closely related to success in many different courses proves that this skill is an indicator of a student's overall academic success, regardless of discipline (Bloom, 2012).

Reading comprehension skill, which is associated with academic success, refers to the reader's process of constructing meaning from written language through participation and interaction. (Snow, 2002). However, constructing meaning from what is read is not an easy process for the individual. Achieving meaning requires being proficient in a number of skills. Reading fluently, identifying key words by analyzing the text, blending key words with prior knowledge, and making inferences by remaining faithful to the context of the text are among these skills (Sweet & Snow, 2003). From this point of view, it is understood that reading comprehension is a complex process that requires the use of many high-level cognitive skills together (NRP, 2000; Perez, 2010). The simplest and most effective way to help students master this complex process is to read a lot (Allington, 1977). By extensive reading, we mean the amount of exposure an individual has to written material over a long period of time rather than an intensive short-term reading program (Cunningham & Stanovich, 1997). It is developmentally difficult for young children to carry out this process alone (Rotter, 1975). Teaching reading skills officially begins in the early years of school. Therefore, teachers are one of the people who play an active role in teaching reading comprehension skills (Sayeski et al., 2019). The fact that reading comprehension is both complex and a lifelong skill shows that there will be many difficulties and setbacks in teaching this skill (Akyol, 2011; Pressley et al., 2006). Indeed, research in the literature indicates that many students need support in the development of comprehension skills for various reasons (fluent reading, reading motivation, etc.) (Hulme & Snowling, 2011; Rasinski, 2017; Wigfield et al., 2004). Teachers must simultaneously monitor, guide, and control crises experienced in the teaching process of reading comprehension skills. This situation brings to the agenda the level of professional resilience that plays an important role in teachers' conducting a quality teaching process even under uncertain and unpredictable conditions (Ebersöhn, 2014; Gu & Day, 2007). Teacher resilience can be defined as a quality that allows teachers to adapt to difficult conditions in their professional lives, struggle with various obstacles and maintain their commitment to the profession (Tagay & Demir, 2016). Teacher resilience has been addressed in a limited number of studies in the literature based on various concepts. In the studies conducted, it has been concluded that teacher resilience has a significant relationship with teachers' job satisfaction (Cencirulo, 2001), stress and burnout (Chan, 2003), organizational commitment (Sezgin, 2010), self-efficacy perceptions (Daniilidou et al., 2020) and attitudes towards their profession (Dönmez & Kavuncuoğlu, 2019). In addition, it has been stated that teacher resilience can have an impact on students' academic performance (Görgülü et al., 2024; Patterson et al., 2004). However, the extent to which teachers' professional resilience levels have an impact on students' academic success continues to be a matter of curiosity. This situation constitutes the main justification of the current research. It is thought that the results obtained from the study will contribute to both satisfying this curiosity and expanding the relevant literature. In addition, the findings obtained may contribute to increasing the awareness of educational administrators about teachers' professional resilience. This may help provide teachers with the necessary organizational support in the context of professional resilience. These potential contributions that the research findings can provide reveal the importance of the study. In this regard, the relationship between the professional resilience of primary school teachers and their students' reading comprehension skills was examined in the study. In the study, reading comprehension skills were considered as a representation of academic success. In fact, the majority of education and training studies are carried out through written materials (Doyle, 1983). For this reason, reading comprehension skills form the basis of academic success, regardless of course (Mollaibrahimoğlu et al., 2024; Yıldız et al., 2019). Based on all these explanations, the following two questions were addressed in the current study:

1. Is there any significant relationship between a teacher's resilience and a student's reading comprehension skills?

2. If there is any significant relationship between a teacher's resilience and a student's reading comprehension skills, what is the level of this relationship?

Method

This research, which aims to reveal the relationship between teachers' resilience scores and their students' reading comprehension skill levels with objective findings, is structured around the positivist paradigm. As a matter of fact, in the process of accessing and evaluating standardized data obtained from indirect measurement tools, it was aimed for researchers to be subjectively separated from the process.

Pattern

This study was designed with the relational survey model, one of the quantitative research methods. The survey model is a useful pattern for obtaining data from a large audience in a short time (Cresswell, 2012). The relational survey model was preferred because it allows investigation of the relationship and predictive power between two or more variables (Karasar, 2014). In this model, researchers cannot make interpretive attitudes during the data analysis phase. The method can be preferred in complex studies, especially since it is predicted based on the literature that such variables are related, but the connectivity of variables from different sources is investigated (Cohen et al., 2018). In this study, where relationship/causality is tried to be revealed, it is an effective method in obtaining a data set from a large population to capture patterns between variables.

Sample

To determine the repetitive trend in relational survey studies in structuring the sample group;

- Ensuring that the sample size is large enough to perform statistical operations,
- Considering the representation of the universe in both variable groups by using demographic variables (class level, institution type) that are accepted for primary school education.
- To meet the conditions agreed upon in the literature in terms of generalizability, the easily accessible sampling method, one of the purposeful sampling methods, was applied gradually in this study.
- In the relevant study, primary school teachers and their students in their classes constitute the study group. Since the primary school teacher group had a smaller numerical size than the students and the teachers of the second study group were determined, gradual sampling was started based on the teachers. Care was taken to ensure that 60% of the teachers to be reached were working in public primary schools and the rest were working in private primary schools, reflecting the universe. The demographic information of the teacher working group is given in Table 1 below.
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Table 1

Teacher Demographic Information

Teacher Demographics	Institution Type	Formal		Private		Total	
		f	%	f	%	f	%
Grade Level	2nd grade	6	19.35%	6	19.35%	12	38.71%
	3rd grade	3	9.68%	7	22.58%	10	32.26%
	4th grade	5	16.13%	4	12.90%	9	29.03%
Total		14	45.16%	17	54.84%	31	100.00%
Gender	Female	11	35.48%	12	38.71%	23	74.19%
	Male	3	9.68%	5	16.13%	8	25.81%
Total		14	45.16%	17	54.84%	31	100.00%
Age (Years)	20-29	-	-	5	16.13%	5	16.13%
	30-39	6	19.35%	8	25.81%	14	45.16%
	40-49	3	9.68%	1	3.23%	4	12.90%
	50-59	4	12.90%	1	3.23%	5	16.13%
	60-60+	1	3.23%	2	6.45%	3	9.68%
Total		14	45.16%	17	54.84%	31	100.00%
Year of Seniority (Years)	0-4	-	-	3	9.68%	3	9.68%
	5-14	4	12.90%	10	32.26%	14	45.16%
	15-29	5	16.13%	2	6.45%	7	22.58%
	30-39	5	16.13%	1	3.23%	6	19.35%
	40-40+	-	-	1	3.23%	1	3.23%
Total		14	45.16%	17	54.84%	31	100.00%
Education Level	Bachelors degree	14	45.16%	13	41.94%	27	87.10%
	Master's Degree	-	-	4	12.90%	4	12.90%
	PhD	-	-	-	-	-	-
Total		14	45.16%	17	54.84%	31	100.00%
Teacher Education	Teacher High School	-	-	1	3.23%	1	3.23%
	Pedagogical Formation Education	2	6.45%	-	-	2	6.45%
	Faculty of Education	12	38.71%	16	51.61%	28	90.32%
Total		14	45.16%	17	54.84%	31	100.00%

Since teachers and their students will also be included in the study group, in the second stage, it was taken into consideration that the preferred teachers were working at different grade levels to ensure a balanced distribution in the grade levels of the students.

Table 2

Student Demographic Information (Institution type and grade level)

Student Demographics	Institution Type	Formal		Private		Total	
		f	%	f	%	f	%
Grade Level	2nd grade	193	25.4%	112	14.7%	305	40.1%
	3rd grade	99	13%	118	15.5%	217	28.5%
	4th grade	143	18.8%	96	12.6%	239	31.4%
Total		435	57.2%	326	42.8%	761	100.00%

Data Collection Tools

Teacher Professional Resilience Scale: "Employee Resilience Scale" was developed by Näswa l, Malinen, Kuntz, and Hodliffe (2019) and adapted to Turkish Culture by Limon (2022) and is a measurement tool prepared to measure the professional resilience levels of teachers. The scale, whose Cronbach alpha value was .853, has a single-factor structure. The 5-point Likert-type scale consists of 9 items. In this study, Cronbach's alpha value was calculated as .70. Cronbach's alpha value of .70 and above means that the scale used is reliable for the study group to which it is applied (Johnson & Christensen, 2014).

Students' reading comprehension skills will be determined through Multiple Choice Reading Comprehension Tests (MCRCT) developed by Baz (2023). Each of these tests, prepared separately for second, third, and fourth-grade levels, consists of eight texts and 16 questions. Item difficulty indices of multiple-choice reading comprehension tests calculated on a class basis showed that the items were of medium difficulty, and there were also questions perceived as harder or easier by the students (Baz, 2023). It was determined that the multiple-choice reading comprehension test had a reliability level of .56 at the 2nd-grade level, .64 at the 3rd-grade level, and .66 at the 4th-grade level.

Data Analysis

The data obtained in the research were analyzed using the "Statistical Packages for the Social Sciences" (SPSS) program. Before starting the analysis process, it was checked whether the collected data were within the specified limits. Then, the total scores of the participants from the data collection tools were calculated. The scores received by the teachers were matched with the scores received by their students and the analysis process began. In the first stage, the Kolmogorov-Smirnov normality test was performed to examine whether the data came from a normal distribution. In the second stage, Pearson's correlation coefficient was calculated to determine whether there was a significant relationship between the teachers' professional resilience scale scores and their students' reading comprehension test scores.

Results

In this section, the findings regarding the sub-problems of the research are presented in tables in line with the data obtained from the data collection tools.

Normality Test

The normality test was used to determine whether the data obtained from the participants in the study exhibited a normal distribution and the results are presented in Table 3.

Table 3

Normality Test

Measures	Kolmogorov-Smirnova			x̄	Median	Skewness	Kurtosis
	Statistic	df	p				
Teacher Professional Resilience Scale	0,111	761	0,000	38,43	38,00	-0,053	-0,964
Multiple Choice Reading Comprehension Tests	0,143	761	0,000	10,92	12,00	-0,863	0,547

To examine the distribution of the data, since the number of participants was over 50, the Kolmogorov-Smirnova analysis, one of the normal distribution analyses, was used. As a result of the analysis, it was determined that the data collected through the "Teacher Professional Resilience Scale" and "Multiple Choice Reading Comprehension Tests" did not exhibit a normal distribution ($p<0.05$). Therefore, it was determined that the distribution did not deviate excessively from the normal distribution due to the closeness of the mean-median and the kurtosis-skewness values between -1.50 and +1.50, which are other assumptions of normal distribution (Tabachnick & Fidell, 2013). Based on this information, statistical methods based on the normal distribution assumption were used for the analysis of the data.

Correlation Analysis

In order to determine whether there is a significant relationship between the independent variable of the study, the "Teacher Professional Resilience Scale" score, and the dependent variable, the "Multiple Choice Reading Comprehension Tests" score, the Pearson Correlation Coefficient was calculated and the results are presented in Table 4.

Tablo 4.
Correlation Analysis

Measures		Teacher Professional Resilience Scale	Multiple Choice Reading Comprehension Tests
Teacher Professional Resilience Scale	r	1	,111**
	p		,002
Multiple Choice Reading Comprehension Tests	r	,111**	1
	p	,002	

According to the results of the correlation analysis, it was determined that there was a statistically positive and low-level significant relationship between the "Teacher Professional Resilience Scale" scores and the "Multiple Choice Reading Comprehension Tests" scores (r = 0.111, p = 0.002, p < 0.05). In other words, it was determined that when there was an increase in the teacher's professional resilience level, the reading comprehension levels of the students would increase.

Discussion and Conclusion

Reading comprehension skills, which are an important predictor of academic success, vary among students (Başтuğ, 2014; Rabiner et al., 2016). Some learning cannot be observed directly (Mislevy, 1992). It is tried to be measured indirectly with academic achievement tests (Johnson & Christensen, 2014). When written materials are used in this measurement process, it is a prerequisite for students to understand what they read. For students to demonstrate what they have learned, they need to be competent in reading comprehension skills (Akyol, 2011). Indeed, understanding what they read is an important skill for individuals to achieve success in life (Martinez & Fernandez, 2010; Vorhaus et al., 2011). In this context, it is necessary to determine the variables that affect reading comprehension skills.

In primary school, reading education is provided by primary school teachers. The main purpose of reading is comprehension (Gambrell et al., 2002). Therefore, to improve in reading comprehension, it is necessary to improve in reading. This skill needs to be invested in to develop reading comprehension. Reading a lot is essential for the development of reading (Pourhosein Gilakjani & Sabouri, 2016). Reading comprehension skill is a process skill that develops through a lot of reading (Grellet, 1981). Students learning to read for the first time need to read a lot to understand what they read.

Primary school children have an external locus of control during their developmental period (Rotter, 1966). Since children in this age group are largely dependent on external guidance from their social and educational environments, they tend to have an external locus of control (Rotter, 1975). Primary school children are guided and controlled by adults. During this process, their dependence on external authority figures and rules causes them to have an external locus of control (Rotter, 1966). They must be supported by external control in order to continue the work required to become competent in a skill. It was assumed that the durability that will provide this continuity belongs to the classroom teacher, who is the external control source. In this context, this study was conducted by predicting that there is a relationship between the professional durability of teachers and their students' reading comprehension skills.

As predicted, in a sample accepted by the literature as showing a normal distribution, correlation analyses revealed a low-level positive relationship between the professional durability of teachers and the reading comprehension skills of their students. The relevant causality determination was made in this way. To explain this causality, findings, and interpretations from the literature are discussed in this section.

There is no study in the literature that directly investigates the relationship between the teacher's resilience and his student's reading comprehension skills. Within the scope of this study, the student's reading comprehension skills are an indicator of academic success. Teacher resilience is also a dimension of the outcome of teacher job satisfaction (Demirtaş, 2010). With the aim of observing more clearly the relationship between teachers' job satisfaction and their student's academic achievements, the reading comprehension dimension of academic success and resilience, which is an important indicator of teachers' job satisfaction, was preferred. Indeed, while the reading comprehension skill requires a long-term educational process, it has been predicted in the context of the locus of control theory that the teacher's resilience can be the provider of this process.

Locke (1978) defined job satisfaction as the positive emotional state resulting from appreciation of one's job. The level of job satisfaction of teachers is very high affects positively the educational aims come true. It is expected that a school that has teachers with high levels of job satisfaction brings up successful students (Demirtaş, 2010). A teacher must be satisfied with the job in order to maintain continuity in the job (Locke, 1976; Skaalvik & Skaalvik, 2017). Apart from the demographic variables of the teacher, an important dimension of job satisfaction is professional resilience and a high positive correlation has been found between them (Roman-Oertwig, 2004; Polat & İskender, 2018). When teachers' job satisfaction decreases, they are more likely to stop providing professional training (Skaalvik & Skaalvik, 2011). Giving up professional training decreases students' academic success. Students of satisfied teachers and of teachers who are psychologically well are more likely to attain

than students whose teachers are dissatisfied or emotionally exhausted (Arens & Morin, 2016)

There are few studies investigating the relationship between teachers' satisfaction and students' academic achievements directly with teachers and students. It has been determined that there is a relationship in the results, but often the size of this relationship can change. A positive and significant relationship was found between the TALIS results, which also include questions on teacher job satisfaction, and the PISA results, which address students' academic success (Dicke et al., 2020). In this study, positive results were obtained, but the strength of the relationship was low. It is thought that the methods and measurement tools used in these different studies cause the results to be similar or different. Different scales and analysis techniques may cause different results in studies conducted on the same subject (Johnson & Christensen, 2014). Likewise, it is estimated that the sample size and the characteristics of the study group also cause the strength of the relationship to be different. Similarly, in another cross-sectional study conducted in Africa, a positive relationship was found between teacher job satisfaction and students' learning outcomes (Michaelowa, 2002). The positive relationship is in line with the findings of this study. Although the direction of the relationship was similar, the strength of the relationship differed. The reason for this situation is that studies conducted in different countries may show that the effects on teachers' professional resilience and job satisfaction may vary due to cultural values, education systems, and the way societies view teachers (Hofstede, 1980). These differences may reveal the effect of teachers' resilience on student achievement in different ways. As can be understood from this, since teacher resilience is also a dimension of teacher job satisfaction, there is a relationship between the academic success of their students.

Various studies have found positive relationships between teachers' job satisfaction and their students' academic achievements. Polly et al. (2022) revealed that teacher satisfaction is an important factor in mathematics achievement, and stated that increasing teachers' job satisfaction positively affects students' mathematics scores. The positive relationship between teacher satisfaction and resilience and student achievement shows that the psychological and professional state of the teacher affects the academic performance of students. The relevant study supports this research and indicates that it is an interdisciplinary situation. High satisfaction and resilience levels of teachers allow them to be more motivated and effective in the educational process, which can positively affect students' success in both reading comprehension skills and subjects such as mathematics. These findings reveal that the effect of teachers' job satisfaction and resilience on students' general academic performance is an interdisciplinary situation. Similarly, a study conducted by Banerjee et al. (2017) found that there was a moderate positive relationship between teachers' job satisfaction and students' reading achievement. This finding suggests that teachers' job satisfaction can affect students' performance not only in mathematics but also in other academic areas such as reading skills.

Additionally, a positive relationship was found between teachers' resilience and students' reading comprehension skills, but this relationship was weaker. This is because teacher resilience has been considered as only one dimension of teacher job satisfaction. For example, in a study conducted by Beltman and Mansfield (2018), it was stated that teacher resilience was a component of general job satisfaction, but that this component had a limited effect on students' reading comprehension success. Therefore, it is estimated that the weak relationship between teacher resilience and student success is due to the fact that only one dimension of job satisfaction was examined. A more in-depth examination of different dimensions of teachers' job satisfaction may allow us to better understand their impact on students' academic achievement. In this context, investigating to what extent factors such as teachers' motivation, workload, and working conditions affect student success can make important contributions to the literature in this field (Klassen & Tze, 2014; Skaalvik & Skaalvik, 2017). The study supports previous research that emphasizes the weak positive relationship between teacher resilience and students' reading comprehension skills. Considering that teacher resilience is only one component of overall job satisfaction, the effect of this component on student achievement is limited. Therefore, the findings of the study indicate that teacher resilience alone is not sufficient and that an in-depth examination of other dimensions of teacher job satisfaction will provide significant contributions to better understanding its impact on students' academic achievement.

In the literature, there are also studies that support the findings of this study, showing that there are positive but low-level relationships between teachers' job satisfaction and student success. For example, the study conducted by Jerrim (2024) examined the relationship between teacher job satisfaction and quality of learning more comprehensively. When students' academic test scores, expert opinions, and student opinions are included in addition to teachers' comments on job satisfaction and quality of learning, there is no evidence that teacher job satisfaction is attributable to their student's academic outcomes. In a study conducted at the high school level in Pakistan, there was a strong positive relationship between students' success and teachers' job satisfaction, but

no significant connection was found between them (Iqbal et al., 2016). Similarly, a study conducted at the higher education level by Borah (2016) revealed that there was no significant relationship between teachers' job satisfaction and the academic performance of their students. This shows that the effect of teacher satisfaction on student success is minimal and does not affect students' academic success in higher education. It is thought that the lack of significance in these relationships may be due to the students' ages. As students get older, the meaning that authority figures attribute to them changes as their abstract thinking skills develop. In this context, Rotter's (1966) theory of internal and external locus of control suggests that children at older ages tend to act with an internal locus of control or may ignore external sources of control. Therefore, older students may be less affected by their teachers' job satisfaction and more able to manage their own academic success independently. This supports the assumption that student age moderates teacher influence and suggests that teacher satisfaction may have a more pronounced effect on younger students (Deci & Ryan, 2000; Wentzel, 1997).

Consequently, the effect of teacher satisfaction on student achievement may differ depending on students' developmental stages, teacher-student relationships, and level of education. In this context, it is thought that interventions aimed at increasing teachers' job satisfaction may have more pronounced results, especially for younger students.

The findings of this study reveal a positive but low-level relationship between teachers' professional resilience and their students' reading comprehension skills. This suggests that while teacher resilience can be an important factor in students' academic success, its impact may be limited. Specifically, factors such as teachers' job satisfaction and resilience may have significant effects on students' long-term educational processes, but these effects can vary depending on variables such as students' age and developmental stages.

In this context, interventions aimed at enhancing teachers' professional resilience are expected to contribute to the development of reading comprehension skills, particularly in younger students. However, the low-level relationship observed in this study is likely because resilience represents only one dimension of job satisfaction, and this dimension's impact on student success is relatively limited. Future research should explore the different dimensions of teachers' job satisfaction and their effects on student achievement in more depth to reach more comprehensive conclusions.

In conclusion, the positive but low-level relationship between teachers' professional resilience and students' reading comprehension skills is an important finding that should be considered in developing educational policies and supporting teachers. Strategies aimed at increasing teacher job satisfaction and resilience may yield more effective outcomes, especially in educational processes involving younger students.

In terms of educational impact, this study provides important implications for improving educational processes by showing that there is a significant relationship between teachers' professional resilience and students' reading comprehension skills. Increasing teachers' job satisfaction and resilience is of great importance for students to ensure long-term development in critical academic skills, especially reading comprehension. Since teachers with high professional resilience are more resilient in coping with the challenges they face, they have the potential to further develop their students' reading comprehension skills by providing them with more consistent education. Students' reading comprehension plays a key role not only in their academic success but also in their lifelong learning processes. This skill can directly impact students' success in other subjects, and strong reading habits form the basis of lifelong learning. Therefore, improving teachers' professional resilience will contribute to the permanent improvement of students' reading comprehension skills.

The role teachers play in developing reading comprehension skills is at the center of educational processes. In this context, balancing the workload to support teachers' professional resilience will enable teachers to be more motivated and focus more on their lessons. Professional development opportunities and practices that encourage teachers to work collaboratively will increase their impact on education and directly contribute to students' reading comprehension skills. Increasing teachers' professional satisfaction and resilience will enable students to show more interest in reading comprehension processes, paving the way for their long-term academic success. Building strong foundations in reading comprehension skills, especially in primary school, will allow students to cope more effectively with the academic challenges they face in their later education processes. Therefore, supporting teachers' professional resilience to increase reading comprehension success will contribute significantly not only to individual students but also to the success of the general education system.

Limitations and Future Studies

This study has certain limitations. First, teachers' professional resilience was considered as only one dimension of job satisfaction, and other dimensions (e.g., teacher-student relationship, professional motivation, workload) were not examined. This may narrow the scope of the findings. Additionally, the research was conducted on students in a certain age

group, and the results have limited generalizability for different age groups and education levels. The fact that the study was limited to data collected by cross-sectional does not provide sufficient information on how the relationship between teacher resilience and student achievement may change in the long term.

In future studies, the effects of other dimensions of teachers' job satisfaction on students' academic achievement should be examined more comprehensively. In particular, the effects of factors such as teachers' motivation, working conditions, and workload, as well as professional resilience, on students' reading comprehension skills should be investigated. Moreover, conducting such studies on larger and more diverse sample groups will increase the generalizability of the results. Long-term longitudinal studies may provide a better understanding of the relationship between teacher resilience and student achievement over time. Finally, similar studies can be conducted in different cultural and socioeconomic contexts to assess the validity and applicability of the findings in different contexts. Such comprehensive studies will contribute to a deeper understanding of the relationship between teacher resilience and student achievement.

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