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Special issue

Literacy and Education: From Theory to Practice

Literacy in the Romanian Educational Context: Challenges and Solutions

Editorial

Cosmina Simona LUNGOCI•, Ioana DÂRJAN••

Literacy is one of the eight key competences for lifelong learning, defined as "the ability to identify, understand, express, create, and interpret concepts, feelings, facts, and opinions in both oral and written forms, using visual, auditory, and digital materials across disciplines and contexts" (EU, 2019). It is essential for effective communication and interaction, fostering creativity and further learning. Literacy skills are integral to a child's educational, professional, personal, and social development, enabling critical thinking, imagination, and creativity. Conversely, poor literacy skills can lead to professional failure and vulnerability to manipulation or fraud. As such, literacy is a priority in contemporary education.

In this context, issue 2 of the *Journal of Educational Sciences*, published on the journal's 25th anniversary, explores literacy in educational contexts. It presents specific theories and practices that trace the evolution of pedagogical concepts alongside systemic developments in education. Literacy, both a traditional and evolving concept, continually gains new meanings in diverse social and professional spheres.

Systemic solutions are essential to addressing literacy challenges in the Romanian educational system. One study in this issue emphasizes the timeliness of developing digital literacy, mainly through "Digital Oratory" in English language acquisition by high school students. This innovative approach aims to enhance public speaking competence in English by identifying effective predictors such as linguistic proficiency, prior experience, and intelligence. A unique course was designed to explore these predictors, offering research-based recommendations for instructional strategies tailored to diverse learners. The program's success underscores the need to integrate English Digital

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• Lecturer PhD, West University of Timisoara, Department of Educational Sciences, cosmina.lungoci@e-uvt.ro.

•• Associate Professor Ph.D., West University of Timisoara, Department of Educational Sciences, ioana.darjan@e-uvt.ro

Oratory training into high school curricula, reflecting the growing demand among young people for public speaking skills in foreign and native languages.

Literacy is fundamentally a social practice, valued from early childhood in daily interactions. Regular school attendance and tailored pedagogical support are critical for developing literacy skills. Enhancing teaching practices, particularly in teaching core literacy components, can reduce disparities in students' development levels. Teacher training programs are necessary to equip educators with tools to assess and improve students' literacy skills. Using assessment results, teachers can implement individualized pedagogical measures to ensure progress.

Another study in this journal highlights teachers' perceptions of literacy and the urgent need for an equitable and inclusive educational system. Findings emphasize three key areas: prioritizing technical writing skills, teacher-centered methods that overlook individual student needs, and deficit-focused attitudes toward students with special needs. Implementing inclusive practices tailored to the social context can significantly improve literacy development.

Factors influencing reading skills during schooling extend beyond social, economic, and cultural contexts. Effective strategies, including adaptive instruction, teacher support, meaningful feedback, stimulation of reading engagement, and teacher-directed instruction, are crucial. One study advocates for the implementation of systemic intervention strategies for language disorders, which should be a collaborative effort between teachers and language therapists during primary education. Research conducted during the 2023–2024 school year demonstrated the effectiveness of combining classroom teaching with specialist interventions, yielding better outcomes in literacy development.

Family involvement is a crucial factor in early literacy development. As the first socializing agent, families play a significant role in providing the linguistic models children need. Parents can encourage literacy through daily conversations, exposure to reading materials, shared reading activities, and visits to libraries or bookstores. A study in this issue reveals that family literacy activities, such as storytelling and reading aloud, not only enhance children's critical thinking and intellectual curiosity but also strengthen parent-child bonds, fostering communication skills, creativity, and reflexivity.

Professor Charles Temple's important contribution to this thematic issue is his discussion of the role of research in shaping effective teaching practices. Using data from Romanian students' performance in the 2022 PISA tests, Temple emphasizes the importance of accurate result interpretation to design constructive interventions for future assessments. His article offers pedagogical recommendations for supporting literacy from early schooling and proposes inspiring research directions for Romanian educators, drawing on validated international tools and methodologies.

The studies in this issue collectively highlight the importance of early literacy development and its implications at the secondary level. They address systemic challenges such as low literacy levels among Romanian children, a problem requiring

macro-level solutions. The conclusions and recommendations provide actionable strategies for teachers to improve their methods, adopt differentiated approaches, and collaborate with organizations to support literacy development. Early and sustained support for children from families with limited educational resources is essential to increase academic success and reduce dropout rates. By addressing these challenges, Romania's education system can ensure a brighter future for all students.

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Family literacy activities and their role in developing studens' critical thinking

Cosmina Simona LUNGOCI•, Diana Maria NIȚĂ••

Abstract

Literacy activities and critical thinking are two fundamental aspects in the growth and development of primary school students. Parents also play a vital role in children's lives, as they are considered their children's first educators. The time that family members spend together is invaluable and must be used to lead to the harmonious development of children. An interactive and creative example of making the most of their time together can be joint literacy activities, which can develop essential skills for integration into society. The present study aimed to identify a possible correlation between the time allocated to family literacy activities and the development of critical thinking in primary school students. To this end, 24 third-grade students and their parents were assessed using two instruments: a test administered to the students, divided into two sections (dialogical critical attitudes: statements and situations), which focused on aspects of critical thinking, and a questionnaire addressed to parents, which aimed to measure the frequency with which they carry out certain literacy activities with their children. The results obtained from the data collection confirm our hypothesis that there is a link between the time spent on literacy activities in the family and the development of critical thinking in students, with a positive and significant correlation. In addition to this, we tried to correlate each type of activity with the score obtained in the critical thinking test, and in three of the four cases we obtained a positive and significant result. The answers given by the students helped us to observe which dimensions of critical thinking are best developed (intellectual curiosity, creativity) and which ones need more attention in the future (intellectual autonomy).

Keywords: literacy; critical thinking; primary education

• Lecturer PhD, West University of Timisoara, Department of Educational Sciences, corresponding author, cosmina.lungoci@e-uvt.ro

•• Primary School Teacher, Şcoala Gimnazială Nr. 25, Timişoara, diana.nita99@e-uvt.ro

1. Introduction

The present we live in is a dynamic one, and the skills we need to continually develop are increasingly diverse and necessary to adapt and evolve. One of these skills is critical thinking, which is beginning to be at the heart of education, as the mere accumulation of knowledge is overshadowed by technological advances that give us access to information in mere seconds. The problem is the sheer amount of information we receive on a subject and the fact that some of it contradicts itself, and we need to have the ability to find the truth in this avalanche. Critical thinking is not yet within our grasp, and the ways in which we can form and develop it are not sufficiently known.

Another topic we hear more and more around us is parents' dissatisfaction with the time their children spend on reading. In many families, joint reading activities disappear as soon as the child learns to read on his or her own and it seems that the parents' goal has been achieved. Motivation is lacking among children, and the lack of active encouragement and role modeling from the family can create a number of problems in this respect. Reading them stories, reciting poems, singing to them, or making parent-child visits to the library or bookstore are all actions that can bring the two closer together, as well as bringing them closer to reading. Reading aloud to children and giving them the opportunity to ask questions helps to create a positive image of reading. Also, creating a dialog on the basis of the read text contributes both to the development of literacy and comprehension skills, and the influence of such an experience is significant in the third grade, according to experts (Saracho & Spodek, 2010). The free time of children at the beginning of schooling should not be wasted, but should be used in such a way that it contributes to their development. It is well known that literary texts are closely related to the development of critical thinking, as they are not mere words thrown on a piece of paper, but their comprehension involves reasoning (Aloqaili, 2012). Florea & Hurjui (2015) suggest that simply encountering the text does not at the same time represent the development of thinking skills. The context in which it takes place and the opportunities we provide for the child to express themselves are important, creating a transparent framework for learning and thus following the critical and analytical thought process. It is the duty of parents, as well as teachers, to provide students with learning activities that contribute to the development of their critical thinking.

We point out that studies have been conducted that show how important it is for parents to carry out literacy activities with their children during leisure time in order to develop their comprehension and language skills (Pfost & Heyne, 2023). One of the most common activities carried out in families is reading aloud to their children. The results are positive because it helps to develop literacy skills, but the effect is not very large. Sénéchal & Young (2008b) observed that parents need guidance from the school to think of ways of working that have a greater effect. Although this initiative involves more

human and material resources, it is a necessity for the implementation of a literacy program that is appropriate for students.

With these considerations in mind, we set out in our study to identify whether there is any relationship between the time devoted to literacy activities in the family and the development of critical thinking in third grade students. To this end, we administered a questionnaire to parents in order to measure the frequency with which they carry out certain literacy activities in the home environment. In order to measure children's critical thinking skills, we used two tests adapted to the sample we targeted. The test questions addressed six facets of critical thinking: intellectual curiosity, tolerance of uncertainty, open-mindedness, being reflective, creativity and intellectual autonomy.

2. Theoretical background

Family literacy activities can be both an interactive and educational way of spending time together. Niklas & Scnheider (2013) attempt to define such family-based activities as the environment that the family provides for the child to acquire literacy and spelling skills as well as language skills. According to the authors, the introduction of such activities into children's programs can lead to better development on many levels, not just emergent literacy. Children come into contact with written text before they actually start school, so the foundations of literacy are laid during the first years of life with the help of their parents.

We hear more and more often how parents in today's society are becoming increasingly disenchanted with the time their children spend on literary activities, as they are more and more overwhelmed by all the technology that surrounds us and enters our lives. What most parents forget in this context is the fundamental role they play in their children's lives. In many families, children are being read to from the earliest years of their lives, even before they even speak, and Saçkes et al. (2015) also bring up the quality of these shared literacy activities within the family, looking for a way to motivate them. Why do some children enjoy literacy activities while others see it as a chore? The results showed that it is precisely parents' perceptions and beliefs about task involvement that are crucial in motivating children.

Literacy activities help children's development from a number of perspectives, even if the first thing that comes to mind is the role they play in the formation and development of language and vocabulary, one of the future skills that is essential in the world we live in is critical thinking. We tend to treat literacy activities in a superficial way, but Aloqaili (2012) reminds us that written text is not just trivial letters thrown on a sheet of paper. In understanding what is written we need to appeal to thinking, to reasoning. Analyzing the connection between the two concepts, it has been concluded that what helps us to understand a text is, in fact, critical thinking.

Critical thinking

The concept of critical thinking is becoming more and more topical, and in the last century it has received increased attention due to the changes we are witnessing every day. We increasingly need to acquire such a skill in this new and dynamic world. Florea & Hurjui (2015) note the complexity of the thinking process, which starts with the assimilation of new knowledge and ends with decision-making. The link between literacy activities (reading, writing, communication, receptivity) and the development of critical thinking is also very important. Here are a few points in line with the dimensions of critical thinking and literacy activities investigated in our research. Visits to the library arouse intellectual curiosity by discovering information resources in a variety of fields. Reading aloud enables active reading, during which the reader asks questions that stimulate the listener's interest, curiosity and reflection. Storytelling, necessarily followed by questions to check comprehension and to establish the main points relating to the moral dimension of the literary text, helps to develop empathy, tolerance and an open-minded nature of the children. At the same time, by expressing their own opinions on the action, characters and outcome, children reflect on the communicative contexts provided by the literary text, making value judgments in accordance with their own principles or under the guidance of adults, thus developing their intellectual autonomy. Imagination is stimulated during storytelling or reading aloud, by being able to capitalize on predictive reading. Post-reading, children can imagine a different outcome, they can insert other characters into the narrative to influence the course of events through creative writing activities. Exposing children to literary texts in which good and evil are symbolically confronted in a symbolic way, leads them to perceive reality in an appropriate way, helping them to pass the information they are exposed to in everyday life through the filter of critical thinking.

Being a complex and difficult subject to explain, critical thinking has over time received several definitions that have evolved and changed over time. Ennis (1962) asserted that critical thinking involves the correct evaluation of information, this concept later designating the practical reflective activity that aims at a reasonable belief or action as a goal (Ennis, 1987). Borzea (2017a) describes critical thinking as an essential trait for an educated person, as a necessity of the citizen belonging to a democratic society and, more recently, as an imperative skill to cope with the demands of the contemporary world, given that it involves several essential processes in everyday life: decision making, problem solving, analyzing arguments.

In our research, critical thinking was approached from the perspective of several aspects, which we will briefly explain below.

Intellectual curiosity

The focus in educational institutions falls on improving academic performance among students, and along with intelligence and effort, intellectual curiosity is the third basic pillar. Von Stumm et al. (2011) present intelligence as an integral part of intellectual curiosity. In terms of educational environment, intellectual curiosity is a significant variable of academic performance. Researchers recommend that schools should

encourage and reward equally those students who ask questions, not just those who put effort into getting results. They should also provide opportunities to induce and encourage their curiosity, as students and students who feel they are intellectually stimulated tend to enjoy and be more satisfied with the educational experience.

Uncertainty tolerance

Hillen et al. (2017) recognize the complexity of the phenomenon and the difficulty in outlining a concrete and comprehensive definition of the term. It refers to the entire set of positive or negative, psychological-level responses arising from an awareness of ignorance about various aspects of the world. Note that it includes several variables, such as ambiguity or probability and complexity, which can be sources that help to amplify uncertainty. Ambiguity is the lack of credibility of information, and is the main underlying cause of uncertainty. Probability refers to the vagueness of future events, while complexity suggests the many facets of a phenomenon, which make it difficult to understand its meaning.

Open-mindedness

In a world full of diversity, being tolerant and being open-minded seem to be two fundamental elements for the good development of today's society. We are confronted more often than ever with cultural, religious and ethnic diversity, we meet people with different values and principles, and openness to accept them is vital. Adler (2004) presents the concept of open-mindedness in an educational context, emphasizing its integration within the already existing subjects of study in schools. Within an educational system that aims to be democratic, open-mindedness means promoting a variety of values for students to critically evaluate. Advocating for open-mindedness is an essential part of the central mission in education, which aims to prepare students to inquire, to be self-critical and to learn from experience (Adler, 2004).

Being reflective

It was John Dewey who advocated the integration of reflective thinking in education, and Rodgers (2002) summarized his studies to better explain the concept. Reflection is defined as a systematic and rigorous way of thinking, being a process of observing and describing complexity, which integrates attitudes that lead to intellectual growth. This way of thinking can only be formed and developed through interaction with people in the community. In this way, the interconnected relationship between school and society is observed. In the teacher-student relationship, 'being reflective' means adapting to the group of students, recognizing diversity and change, adapting your teaching style to lead students towards knowledge, towards learning. A classroom where this skill is fostered and developed is a vibrant space where silence is not encouraged, teacher and students communicate and interact.

Intellectual autonomy

Pritchard (2016) draws attention to how intellectual autonomy has been misinterpreted from the perspective of meaning to totally ignore other people's testimonies. What intellectual autonomy entails is taking responsibility, accessing one's

own cognitive resources in order to position oneself in relation to a subject, in order to understand in depth, the phenomenon in question. A free society wants its citizens to be able to critically assess the situations in which they find themselves, to filter the information they receive through the filter of thought and not to allow themselves to be influenced in their decision-making, i.e. not to allow themselves to be manipulated.

Creativity

Plucker et al. (2004) define creativity as the interaction between skills, process and environment, whereby an individual or group produces a perceivable, novel and useful product. Ruiz-Del-Pino et al. (2022) present creativity as an important skill for the century in which we live, given the changes in the social environment that comes with the continuous development of technology. The term creativity is beginning to receive increased attention, within several fields, and is no longer associated only with the artistic side. The generation of multiple and varied ideas leads to problem solving and is an important means of training and developing critical thinking.

The role of school in developing critical thinking

From the earliest years of life until the end of adolescence, much of our time is spent in the educational environment, at school. The key competences that we need to acquire at the end of our schooling cannot be achieved using only traditional teaching methods, but starting from these, we try to find ways for the teacher to reach the student, managing to stimulate them. Santos (2017) notes the change that teachers who think critically and creatively bring to education, through their ability to manage to look at a situation from multiple perspectives. Such teachers want students in the classroom who ask questions, engage in discussion and debate, are not afraid to think and share ideas. We mention two pedagogical methods that are effective in stimulating critical thinking: *Evocation-Realization of Meaning-Reflection* and *Five Steps to Critical Thinking*.

The *Evocation-Realization of Meaning-Reflection* method involves three stages in the development of a learning process aimed at developing critical thinking in students (Szabo, 2020). Evocation makes reference to the reactualization of knowledge previously acquired by the learner, knowledge that underpins the appropriation of new content. Realization of meaning is the stage in which the learner confronts the new content, trying to understand its meaning. Reflection refers to the critical analysis of the new content, where students have the opportunity to explore and integrate it in concrete contexts, linking it to what they already know. Each stage of the method draws on a wider range of cognitive processes, depending on its purpose. (Dulamă, 2008)

The Five Steps for Critical Thinking method is inductive and promotes the teaching of new content from practice (reality) to theory (abstract). The first step, determining the goals of the lesson, includes lesson preparation, with the teacher determining the behavior he/she wants the students to achieve. Teaching by questioning is the stage in which the teacher uses the conversational method of questioning. These are intended to stimulate students to think critically, challenging them to search for and find answers to the problems and phenomena being addressed. The third step, Pre-assessment practice,

challenges students to be actively involved in their own learning. The Review and Improvement step is where the teacher receives feedback from the students, summarizing what they have learned and monitoring how the children have engaged in the activities. Giving feedback and assessing learning is when the teacher gives feedback to the students. This last stage is actually the starting point in the design of the next lessons, giving the method a circular form. (Sâmihăian, 2014)

There is a wealth of previous research that has demonstrated the importance of family literacy activities on students' motivation to read, the development of literacy competence, and the development of critical thinking.

Van Der Kleij et al. (2022) conducted a study in which they set out to investigate whether there is any correlation between children's leisure reading, vocabulary development and reading comprehension. The study involved a sample of 598 students, aged between 10 and 12. The research measured four variables: reading efficiency, leisure reading, vocabulary and reading comprehension. The analysis of the data provided several conclusions: leisure reading contributes to the development of vocabulary as well as to the cultivation of students' motivation for reading. It is emphasized that children need support from adults in literacy activities, through which they receive help in text comprehension and become motivated to continue the work individually.

Recently, Paakkari et al. (2024) published a study that aimed to identify factors in the home environment that lead to the development of critical reading skills, involving a group of Finnish researchers. The aim of such a study arose from the realization that there is a growing need to develop critical thinking skills and to implement activities to support their development from early childhood. The instrument used by the researchers was the *Delphi Method*, which collected the opinions of several experts on specific factors in the home environment that support or hinder the development of children's critical reading skills. As a result of the analysis, 13 factors positively influencing literacy development and 9 negatively influencing factors were identified. The most important factor in the development of critical reading skills was found to be: *In family discussions, the child is given the opportunity to reflect, ask questions and be listened to*. In opposition to this, the factor found to most hinder the development of critical thinking was: *The family follows strong ideologies that do not allow different views or ideas*. The importance of discussions within the family is emphasized, especially if the topics being discussed are of interest to the child, as the child feels listened to and included in decision-making.

The school and the family should form a close partnership in terms of educating students, and Murphy et al. (2014) have sought to identify ways in which critical-analytical thinking can be developed in children through the input of both parties. School is the formal environment in which students develop these skills, but their promotion is best to start in the family. The study has two central aims: how home and kindergarten activities, such as play and dialoguing, can stimulate critical-analytical thinking, and to highlight how school practices and actions can promote this skill. Following the

experimental intervention carried out, the researchers found that critical-analytical thinking skills can be fostered through dialogic thinking in the context of mathematics and literacy. The authors suggest that there is a need to organize training programs to train teachers to promote ways of developing analytical thinking.

3. Methodology

Specific hypotheses

The present study focused on finding an answer to the following general research question: "Is there a relationship between the frequency of literacy activities carried out in the home and the development of students' critical thinking?". The main research hypotheses were:

I. There is a correlation between the frequency of family literacy activities, such as learning poetry, rhymes and songs, and the development of critical thinking.

II. There is a correlation between the frequency of family literacy activities, such as library visits, and the development of critical thinking.

III. There is a correlation between the frequency of family literacy activities such as reading aloud and the development of critical thinking.

IV. There is a correlation between the frequency of family literacy activities, such as telling stories/stories invented or told, and the development of critical thinking.

Research design

The research carried out was non-experimental, cross-sectional, correlational, considering two main variables: the independent variable, represented by the frequency of literacy activities carried out in the family, and the dependent variable, represented by critical thinking, from the perspective of the following dimensions: intellectual curiosity, tolerance of uncertainty, open-mindedness, being reflective/reflexivity, creativity and intellectual autonomy.

Participants

The research involved 48 participants, including 24 third grade students, 13 (54.16%) male and 11 (45.84%) female, and their parents.

Tools used for data collection
Literacy activities

To measure the frequency with which parents or other family members engage in literacy activities with their children, we administered a questionnaire comprising four questions. The activities targeted were learning poems, rhymes or songs, visits to the library, reading aloud and telling invented or re-told stories/fairy tales. Parents' answers were collected using an eight-point Likert scale (1 = several times a day, 2 = once a day, 3 = several times a week, 4 = once a week, 5 = several times a month, 6 = once a month, 7 =

less frequently, 8 = never). The questions were drawn from *Starting Cohort 2 - Kindergarten, From Kindergarten to Elementary School* coordinated by the National Educational Panel Study (NEPS) with the support of the Leibniz Institute for Educational Trajectories (FDZ-LIfBi, 2020). The NEPS was created to describe and explain the lifelong development of individual skills by providing longitudinal information about educational trajectories. An important role in the development of competences is played by learning environments such as formal, informal and family learning environments, and several instruments have been developed that examine the mediators of school learning environments. Language and literacy skills are receiving particular attention, leading to a survey of children's support in language learning and development (Artelt & Sixt, 2023).

Critical thinking

Measuring critical thinking required the search for an instrument that would be age-appropriate for the children in our sample. Based on standardized tests already existing in the literature, Auriac & Daniel (2008) developed the ACDS test ("le test d'Attitudes Critiques Dialogiques en Situations"), which complements the previous tests. In order to provide more validity to the test, Auriac-Slusarczyk et al. (2011) applied and compared the CM3 ("California Measure of Mental Motivation Scale") and ACDS tests. While the CM3 measures dimensions of critical thinking, such as creative problem solving, learning orientation, mental focus or cognitive integrity, with a school-space orientation, the ACDS focuses more on the social intelligence dimension, proposing out-of-school situations. The proposed situations aim to achieve and measure the following facets of critical thinking: intellectual curiosity, tolerance of uncertainty, open-mindedness, being reflective, creativity and intellectual autonomy.

In the version provided by the authors of the ACDS test, which they made available to us for the present study, it is divided into two complementary tests: Dialogic Critical Attitudes and Statements and Critical dialogic attitudes. Situations. The first test is composed of 12 items (two items for each dimension analyzed) and challenges the students to position themselves in relation to the statements offered, with two response options: True or False (E.g. "I am curious. I really like to discover new things.", "I don't feel comfortable when I don't know which game to choose.", "I don't mind when others have different tastes from mine.", "When I write a greeting card, I don't think about what to write beforehand.", "In the schoolyard, I am more afraid of other people's ideas.", "I like to invent things."). The second test gives the children 6 situations (one for each dimension of critical thinking) and 3 possible answers in each case, with the students choosing the reaction that best suits them:

E.g. During a visit to the zoo, I saw an animal I didn't know.

It doesn't matter that I don't know what it's called.	I'd like to know what it's called.	I'll look it up on the internet or in my books.
▯	▯	▯

The scoring of the tests is done by giving a score between 1 and 3, depending on how students choose to position themselves in the cases offered.

Research procedure

For the present study we involved primary school students, enrolled in third grade, in an educational institution in Timisoara. After obtaining consent for participation in the study from both parents and their own children, the questionnaires were administered in physical format. For the students, during the test, each statement was read aloud, and after circling the answer, the statement was read again. Students were given the opportunity to ask questions when aspects were unclear and explanations were provided.

4. Research results

Presentation of descriptive data

The descriptive information obtained at the end of the data collection provides us with an overview of the study participants and their results. The table below provides information on the mean scores, maximum score, minimum score and standard deviation for each dimension of critical thinking measured.

Table 1

Descriptive data for the results obtained by participants (N = 24)

Variable	M	SD	Min.	Max.
Intellectual curiosity	8,87	0,33	8	9
Tolerance of uncertainty	7,37	1,31	5	9
Open mind	8,12	0,85	7	9
Reflexivity	8,08	1,55	5	9
Creativity	8,25	1,29	5	9
Intellectual autonomy	6,12	1,42	3	9
Total	46,83	3,78	38	51

Note: N = number of participants; M = mean; SD = standard deviation; Min. = minimum score; Max. = maximum score.

As can be seen, for each dimension, the minimum score obtained was 3 points and the maximum score was 9 points. The variable with the highest average score is intellectual curiosity (8.87 points), which is close to the maximum score, the difference between the highest and the lowest score being only 1 point. Although high averages were also obtained for the other variables, the differences between the minimum and the

maximum are higher (2 points for open-mindedness and 4 points for tolerance of uncertainty, reflexivity and creativity). The lowest score was obtained for intellectual autonomy, being the only dimension where the lowest possible score was recorded and where only one student scored the highest, with an average of only 6.12.

Presentation of results in relation to specific hypotheses

Hypothesis 1: There is a correlation between the frequency of family literacy activities, such as learning poetry, verses and songs, and the development of critical thinking.

From the table below (Table 2), there is a significant correlation between learning poetry, verses and songs in the home environment and students' critical thinking development, $r(22)=0.622$, $p<0.001$, which means that students who learn poetry, verses and songs more often in the home environment have higher critical thinking score. Since r is an expression for effect size, the relationship between the two variables is very strong. The coefficient of determination is obtained by $R^2 = 0.38$, which means that for 38% of the variance of the variable learning poems, verses and songs is explained by the critical thinking variable.

Table 2

Spearman's analysis of the correlation between learning poetry, verses and songs and critical thinking. (N=24)

Variable	Critical thinking score
Learning poems, verses and songs	.622**

Hypothesis 2: There is a correlation between the frequency of family literacy activities, such as library visits, and the development of critical thinking.

The table below (Table 3) shows that there is a non-significant correlation between visiting the library with the family and students' critical thinking development, $r(22)=0.112$, $p<0.603$, which means that students who go to the library more often do not have higher critical thinking scores.

Table 3

Spearman's analysis of the correlation between library visits and critical thinking. (N=24)

Variable	Critical thinking score
Library visits	.112**

Hypothesis 3: There is a correlation between the frequency of family literacy activities such as reading aloud and the development of critical thinking.

From the table below (Table 4), there is a positive correlation between reading aloud in the home environment and students' critical thinking development, $r(22)=0.449$, $p<0.028$, which means that students who are read aloud in the home environment have higher critical thinking scores. Since r is an expression for effect size, the relationship between the two variables is very strong. The coefficient of determination is obtained by $R2 = 0.20$, which means that for 20% of the variation in the read aloud variable is explained by the critical thinking variable.

Table 4

Spearman analysis of the correlation between reading aloud and critical thinking. (N=24)

Variable	Critical thinking score
Reading aloud	.449**

Hypothesis 4: There is a correlation between the frequency of family literacy activities, such as telling invented or re-told stories/fairy tales, and the development of critical thinking.

The table below (Table 5) shows that there is a positive correlation between telling invented or re-told stories/fairy tales in the home environment and the development of critical thinking of students, $r(22)=0.476$, $p<0.019$, which means that students in families where invented or re-told stories/fairy tales are told have a higher critical thinking score. Since r is an expression for effect size, the relationship between the two variables is very strong. The coefficient of determination is obtained by $R2 = 0.22$, which means that for 22% of the variance of the variable invented or re-told stories/stories is explained by the critical thinking variable.

Table 5

Spearman's analysis of the correlation between the telling of invented or re-told stories/fairy tales and critical thinking. (N=24)

Variable	Critical thinking score
Telling of invented or re-told stories/fairy tales	.476**

Research Question: Is there a link between the frequency of literacy activities in the family and the development of critical thinking skills of students?

From the table below (Table 6) it can be observed that there is a positive correlation between the frequency of literacy activities and the development of critical thinking of students, $r(22)=0.543$, $p<0.006$, which means that students in families with different literacy activities have higher critical thinking score. Since r is an expression for effect

size, the relationship between the two variables is very strong. The coefficient of determination is obtained by $R^2 = 0.29$, which means that for 29% of the variance in the variable family literacy activities is explained by the variable critical thinking.

Table 6.

Spearman analysis of the correlation between literacy activities and critical thinking. (N=24)

Variable	Critical thinking score
Literacy activities	.543**

5. Discussion

The main purpose of our study was to identify the existence of a possible correlation between the development of literacy activities in the home environment and the development of critical thinking in primary school students (3rd grade). The results obtained by applying the questionnaire addressed to parents to determine the frequency with which they carry out certain literacy activities with their children and the test addressed to students to measure critical thinking, showed a significant positive correlation between the two variables. The questions in the questionnaire completed by the parents helped us to identify four types of literacy activities in relation to which the research hypotheses were formulated: learning poems, verses and songs, reading aloud, visits to the library, and retelling invented or re-told stories/fairy tales. The frequency of each type of activity in relation to the students' scores on the critical thinking test led us to identify three positive correlations, which we will present below.

The first related literacy activity, learning poems, verses and songs within the family, is carried out in almost all families in the sample, less frequently or several times a week, with two parents ticking the 'never' option and in only one case the activity is carried out daily. The correlation between the two variables was positive and significant. We also noted that for the children who scored the highest on the test, the family literacy activity was highly frequent (several times a week or once a day).

The activity of reading aloud by the family to the children is the activity that is carried out with the highest frequency compared to the other three activities brought up. In all families this type of interaction occurs less frequently or several times a day. In this situation too, we could notice that in the case of the students who obtained the best result in the test, the frequency of the activity was high. We found a positive and significant correlation between reading aloud and the level of critical thinking. A similar correlation was found between retelling stories/stories invented or re-told within the family and critical thinking. In this case, the frequency of such activity varied from 'never' to 'several times a day'.

Our results thus follow on from previous studies, which have focused on the importance of developing critical thinking and parental involvement in literacy activities as central themes. While our study measured the frequency with which parents or other family members engage in literacy activities, Saçkes et al. (2015) have at the center of their research the perceptions and beliefs of parents about their children's interests in reading. The study was prompted by the realization of the need for parental involvement in literacy activities that lead to the development of emergent literacy, so important for later academic futures in later learners. Pfost & Heyne (2023) emphasize the long-term importance of developing literacy skills, which contribute to the economic and cultural evolution of the society in which we live and will aid in our understanding of all the other academic concepts we encounter throughout the park of life. The authors wished to emphasize how the occasion of literacy activities (including visits to the library) encourages closeness to books. Prawira et al. (2023) argue that literacy can no longer be seen as simply the ability to read and write. The century in which we live, where technological development is booming, requires the acquisition of skills to understand, interpret, create and communicate in diverse contexts. Seen from this perspective, literacy activities also have an influence on key future skills such as critical thinking and communication. This was also the direction of the research undertaken by Wibowo et al. (2024) who emphasized the importance of supporting children in the formation and development of literacy skills. Given the dynamic context in which we find ourselves, according to the authors of the study, these skills contribute to people's adaptation in society as they include the ability to understand complex content, evaluate information and think critically. School, family and community must work together to form an environment that encourages literacy development. Children's first educators are their parents themselves, and partnerships with them should be promoted and supported, believes Mudzielwana (2014), in a qualitative study investigating the role of parents in the development of young children's literacy skills. The study mentions how interactions with books not only help to develop reading or writing skills, but also the development of critical thinking, which involves higher order reasoning on the part of the reader.

6. Conclusions

Our study emphasizes the importance of literacy activities in the home environment for the development of critical thinking in students. Parents should be aware of the importance of spending quality time with their children. Even if the reality in which we live increasingly limits our time resources, we must not neglect the essential aspects of life. Students need to be prepared for the future, and even if that future seems increasingly uncertain, we must not neglect the training of skills that will facilitate their integration into society. Literacy activities can be a fun way for parents and children to interact with each other, while at the same time helping to develop communication skills, creativity, tolerance of ambiguity, intellectual curiosity or reflexivity.

The present research can represent a starting point towards the implementation of tests measuring critical thinking both for research purposes and for their usefulness in the classroom by teachers. The results obtained may also lead to the integration of new practices in teaching that will increasingly stimulate and motivate students. Parents can also be encouraged to become more frequently involved in their children's education, assuming the crucial role they play in their children's harmonious development. However, for more representativeness and relevance, a larger number of subjects would be recommended.

The instrument used in our research to measure critical thinking is quite different compared to other existing ones, as it targets aspects of everyday life. Auriac-Slusarczyk et al. (2011) observed a certain rigor of critical thinking tests, which are more aimed at students' academic training. Thus, the ACDS test comes with a social perspective on critical thinking and represents a necessary continuity from previous tests. Students are put in the position of making decisions and weighing up the options they have, so it is good that they are aware from an early age of the 'decision-making power' they possess. Students need to be reflective, creative, open-minded, but retain their intellectual autonomy, intellectual curiosity and a tolerance of uncertainty.

Parents need to be increasingly motivated to get involved in the development of critical thinking in their children, because the need for this skill is so precious today. They need to be as well informed as possible about the needs that people will have in the future, i.e. the demands that society will place on their children. In this sense, the school-family-community partnership is extremely important for raising awareness of the development of a family environment that represents a continuity of what happens in the educational environment. Teachers need the support of parents to ensure that students' education is continuous and does not only take place in the school, within the educational institution, but also outside it. The attitude of adults towards school is transmitted and reflected in the behavior of students. The motivation to learn is formed in the family and developed at school.

The practical implications of our research point in the direction of implementing a program to guide parents and provide them with concrete information on how to carry out certain literacy activities with their children. At the same time, we notice that the score obtained by the students on the questions specific to the variable intellectual autonomy were the lowest, located at a rather high distance compared to the other variables. On the basis of this problematic factor, it is possible to analyze the types of activities or interactions that can help to form and develop literacy competence. As Carter (2017) notes, intellectual autonomy is the ability to think independently. The author notes Kant's perception of this ability. The philosopher believes that those who do not use their own intelligence and allow themselves to be guided by those around them or by external things, show "intellectual cowardice". The importance of acquiring intellectual autonomy is necessary in the formation of critical thinking, as it involves analyzing the

information we come into contact with and helps to prevent manipulation. This aspect is sometimes vital in the reality we live in, so uncertain at times.

We wished that through the research topic and the results obtained we could bring an informative addition to the specialized literature. We tried to approach a new theme that would capture the current needs of students and encompass the importance of parental involvement in the training and development of children.

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Development of preparatory grade children's reading skills in Romania

Bianca BALEA•, Maria KOVACS••, Sorana POGĂCEAN•••

Abstract

Since 2012, when preparatory grade (PG) became compulsory in Romania for 6-year olds, little understanding has been gained of how children's literacy evolves in PG, although over the same period, Romanian 15-year olds' reading performance has shown no signs of improvement (Noveanu et al, 2023). Children enter school with broadly varying literacy skills depending on several factors. As their academic success is heavily dependent on their early reading, understanding how children's literacy skills evolve in the early years of school is important for both educators and education policy-makers. This article explores the evolution of Romanian PG students' six emergent literacy skills (ELS) and whether four selected factors influence this evolution (progress in ELS and ELS at the end of PG) significantly: ELS at the start of PG; previous attendance of preschool; school attendance frequency in PG; and socio-economic status. ELS were assessed for 2134 PG students at the beginning and at the end of the school year. A specific emergent literacy assessment instrument (Temple and Temple, 2023) was used yielding scores from 0 (minimum) to 150 (maximum). To measure the changes in six emergent literacy skills (ELS) over the course of the PG (Q1) and determine whether a selection of factors influence progress in ELS and final ELS (Q2), the present research design uses a pre- and post-evaluation approach. Descriptive and inferential statistics were employed. We found an average initial score of 40.5 points and a final average score of 117.9 points, with the average 77.4-point progress being significantly influenced by previous attendance of preschool and school attendance in PG, as well as ELS at the start of PG, but not SES. Children's final scores were however influenced significantly by all four investigated factors.

Keywords: emergent literacy skills; progress in preparatory grade; preschool attendance; school attendance; socio-economic status.

• Bianca Balea PhD., The Romanian Academy, Institute of Sociology, Bucharest, Romania
balea_bianca85@gmail.com
•• Maria Kovacs, Asociaţia Toţi Copiii Citesc, Cluj-Napoca, Romania, maria.kovacs@atcc.ro
••• Sorana Mihaela Pogăcean, Asociaţia Toţi Copiii Citesc, Cluj-Napoca, Romania, sorana.pogacean@atcc.ro

1. Introduction

The present study adds to the findings of an earlier one by Balea et al (2023), when we reported that low SES children who received specifically developed emergent literacy instruction in PG that included developing concepts about print, alphabet and letter-to-sound knowledge, concept of word, phonemic awareness, and word recognition, performed significantly better on these measures at the end of PG than their peers who did not receive such literacy instruction. The same study also found that children who in PG had the lowest scores on the initial assessment performed better on the above-listed measures at the end of PG than their peers with similar scores on the initial assessment in the control group. While the earlier study examined 275 children's progress over a 4-month period only, the present study looked at a 7-month intervention period using 10 sets of literacy materials (six more than in the previous study), and at a much higher number of children (2134).

Like the previous study, this one was also carried out as part of the *Școli cu ScLipici* (Glittery Schools) program, run by the non-governmental organization Noi Orizonturi Foundation, which has been supporting the development of early literacy skills among primary school students, primarily in rural areas, since 2020. The program aims to give children in vulnerable communities a strong start in PG by providing effective literacy learning materials, introducing targeted teaching methods, and helping teachers use literacy assessments to better address early literacy goals (Balea et al., 2023). PG students in Romania do not receive free textbooks; learning materials provided free of charge by the Ministry of Education are only available starting with grade 1 (Ministerul Educației, 2024). In response, in over 200 disadvantaged, mostly rural schools, Noi Orizonturi Foundation has supplied free literacy materials for PG students and a guidebook for teachers, available both in print for direct beneficiaries and as an open-access digital resource. These materials included a teacher's guide, reprintable worksheets, and a set of 10 illustrated children's books for each PG student. The guide and worksheets, which observe the stipulations of the national curriculum, featured activities aimed at developing oral language, phonemic awareness, phonics, decoding, and spelling skills. Teachers received training in ELS assessment, planning and instruction in order to use the literacy materials and learning activities presented in the guidebook effectively. Teachers were also assigned literacy mentors who provided ongoing guidance and support throughout the school year, as needed.

As compared to the business-as-usual situation in PGs across the country, in the classes where the Glittery School program was implemented, the following differed radically, as stated by the teachers: each of the 10 learning units was designed around open access children's books made available for free to each PG student, accompanied by attractively designed worksheets. These children's books are lavishly illustrated, of A5 size, and contain mostly narratives where the characters are friendly animals or children and adults in realistic life situations. One of the 10 books is a non-fiction book. The texts are short (a few short lines per page) and some pages only have illustrations. The second

distinguishing feature of the program is that the teachers assessed their students' ELS, and thus could precisely pinpoint the strengths and areas of growth of each student. It was their first experience with such an assessment and they were provided ample support to carry out the assessments accurately, according to the prescribed protocol. It is important to mention that while the teachers enrolled in the program voluntarily, in some cases, the information reached them via the county school inspectors for primary education.

Our study examines the progress of Romanian PG students in ELS and investigates four factors potentially influencing this progress, including ELS at the start of PG, socio-economic status (SES), prior preschool attendance (PSA), and school attendance (SA). The findings aim to inform early literacy policy and practice especially in vulnerable rural communities, where students' reading literacy performance is significantly lower than in urban areas, as clearly shown by results of various national-level evaluation (Laudoiu, 2022, Noveanu et al, 2023), and therefore the need for support is significantly greater.

2. Literature review

What we know about Romanian students' progress in literacy
Preparatory grade (PG) (also called grade 0) was first introduced in the Romanian education system in 2012, for children aged 6, to bridge preschool and school, and thus facilitate children's adjustment to and integration in the school environment (Institutul de Stiinte ale Educatiei, 2013). A new curriculum for primary grades was launched in 2013, which, within the disciplines called *Communication in Romanian Language* (for PG, grades 1-2), and *Romanian Language and Literature* (for grades 3-4), lays down the envisaged development of primary school children's literacy skills (Ministerul Educatiei Nationale, 2013).

Currently, the first evaluation of Romanian children's literacy skills occurs at the end of grade 2 through standardized national tests introduced in 2014. By this point, students are expected to have mastered foundational literacy skills, and comprehend texts up to 120 words (Ministerul Educatiei Nationale, 2013). The results should inform instruction, so that teachers can optimize student learning and take appropriate measures to support accelerated development of students' literacy skills (Laudoiu, 2022). However, these evaluations are not diagnostic tools for identifying specific reading subskills such as fluency or decoding, leaving gaps in identifying students at risk of falling behind. In addition, the evaluation yields no data about students whose literacy skills are too limited to take this pen-to-paper test. Thus, teachers should dig deeper in a multi-step manner to diagnose students' literacy skills: for poor comprehenders, for example, they should further assess fluency. If fluency is found to be adequate, teachers can conclude that they should concentrate on improving students' comprehension, but if fluency is not adequate, then they should further assess decoding skills. Finally, if decoding is found inadequate, then they should work on word recognition (Jones et al, 2016). When word recognition

needs improvement beyond grade 2, this could be interpreted as a sign that students are still performing at PG level foundational literacy. As 15% of Romanian second graders (and of those in rural schools, over 20%) cannot understand written messages in familiar communication contexts, (Laudoiu, 2022), earlier warning and effective intervention measures are needed to prevent children's failure to learn to read by the end of grade 2: the more these interventions are delayed, the bigger the risk that children will remain further and further behind their grade-level peers (Stanovich, 1986, National Reading Panel, 2000, Torgesen et al, 2001, Fuchs and Fuchs, 2006).

Given the well-established impact of early reading skills on later performance (Juel, 1988; Cunningham & Stanovich, 1997), and the finding that an additional year of schooling can boost students' scores by 20 points in the Program for International Student Assessment (PISA) (Avvisati & Givord, 2021), it would be reasonable to expect improved reading performance by age 15 with the introduction of PG, an extra year of schooling. However, the reading performance of 15-year-old Romanian students has shown no improvement over the past 12 years. In fact, there was a slight decline, with the average reading literacy score dropping from 438 in 2012 to 428 in 2022 (Noveanu et al., 2023); 42% of Romanian 15-year-olds still lack basic reading literacy skills. This percentage could be even higher, as Romania's PISA 2022 coverage rate was only 76%, meaning that 24% of 15-year-olds were either not enrolled, had left school, or were in a grade below 7th due to grade repetition (Noveanu et al., 2023).

In PISA 2022, there was a 93-point gap in average reading literacy scores between students in urban schools (437 points) and those in rural schools (343 points) (Noveanu et al., 2023), highlighting the need for greater support in rural areas. Additionally, the influence of socio-economic background on Romanian students' performance increased to 26% in 2022, compared to 19% in 2018, far exceeding the OECD average of 15% (Noveanu et al., 2023). This underscores the urgent need for effective measures to reduce the impact of socio-economic disadvantages on student outcomes.

Studies of early literacy skills in Romania

While early literacy skills development is extensively studied internationally, and especially in English language environments, in Romania this field of study has received little attention despite the unsatisfactory results in reading performance of 15-year olds, as reported in PISA.

Bodea-Hategan and colleagues (2018) established oral reading fluency norms for PG and grades 1 and 2, designed for use by teachers and language disorder specialists to identify at-risk students and develop tailored intervention plans. For PG, only the number of letters read per minute was recorded, with an average of 57.7 letters read and 2.2 errors per minute. However, the study had an underrepresentation of rural areas, with only 120 students from rural schools compared to 933 from urban schools.

In a longitudinal study, Dolean et al. (2019) found that socioeconomic factors—such as mother's education, family income, housing conditions, and parental employment status—not only affect primary school children's early word reading skills (e.g.,

phonemic awareness and letter knowledge) but also limit their further literacy development. Lervåg et al. (2019) similarly found that socioeconomic background, nonverbal IQ, and school absenteeism influence the development of vocabulary and reading comprehension in Romanian children aged 7-10 living in severe poverty. Their findings suggest that poverty negatively impacts both reading skills and verbal ability development.

Balea et al. (2023) reported that in vulnerable rural communities in Romania, specifically designed literacy instruction in PG—focusing on concepts about print, alphabet and letter-sound knowledge, word recognition, and phonemic awareness— resulted in greater progress than typical "business-as-usual" literacy instruction.

Key emergent literacy skills

Emergent literacy, a term introduced by the New Zealand researcher Marie Clay in 1960s, refers to the early stages of literacy development, beginning in infancy and continuing through preschool to kindergarten. It encompasses children's interactions with written text in everyday experiences, such as listening to stories, recognizing environmental print, and experimenting with drawing and scribbling. At the start of learning to read, children must grasp the alphabetic principle—the understanding that symbols in a writing system represent the sounds of spoken language. Once this insight is acquired, they develop increasingly complex alphabetic decoding skills, progressing from partial to full decoding abilities (Castles, Rastle, & Nation, 2018). Emergent readers acquire critical literacy skills well before formal instruction, which later evolve into conventional reading (Mason, 1980).

Whitehurst and Lonigan (1998) emphasized that emergent literacy is a multifaceted construct involving both mechanical reading skills and broader language and cognitive abilities. They proposed a typology that categorizes emergent literacy skills into two types: inside-out skills, which relate to the mechanics of reading (e.g., phonological awareness, letter knowledge, and decoding), and outside-in skills, which focus on contextual and conceptual aspects of literacy (e.g., vocabulary, narrative skills, and concepts about print). Their review of evidence linking children's literacy environments to skill development found that a) socioeconomic status (SES) influences the quality and quantity of children's literacy experiences, with higher SES children having greater access to rich literacy materials and experiences; b) high-quality early childhood education, which includes structured literacy activities (e.g., phonological awareness games, letter recognition activities), supports the development of emergent literacy skills.

Invernizzi (2003) summarized key findings from reading research, concluding that emergent literacy instruction should include the following components: a) oral language development, including vocabulary and concept growth; b) alphabet knowledge; c) phonological awareness (including phonemic awareness); d) concepts about print (e.g., understanding book organization, print directionality, and letter/punctuation awareness); e) knowledge of letter-sound relationships; and f) the concept of word in text. Bear (2022) added spelling to this list, emphasizing that spelling instruction is a part

of phonics instruction, as it reinforces decoding skills. In addition, Treiman and colleagues (2019) found that, by the end of kindergarten, spelling was a significant predictor of later reading performance, more than just a proxy for phonological awareness and letter-sound knowledge, and therefore it should be considered for inclusion when screening children for future literacy problems.

Emergent literacy assessments

Emergent literacy assessments typically evaluate specific literacy behaviours related to both code-based and language comprehension subskills, with a primary goal of identifying early signs of reading difficulties (i.e., screening). For example, the Virginia Language & Literacy Screening System (University of Virginia, 2024) was developed not only to identify students at risk of reading difficulties but also to assess foundational literacy skills and oral language development, both of which are predictive of later literacy success.

Balea and colleagues (2023) employed an emergent literacy assessment tool in Romanian, which was based on several established instruments, including Marie Clay's Concepts About Print Test (Clay, 2000), Darrell Morris's Beginning Reading Inventory (Morris, 2014), and the Yopp-Singer Test of Phoneme Segmentation (Yopp, 1995). The tool comprises five key components: concepts about print, alphabet knowledge and letter-sound correspondence, concept of word in text, phonemic awareness, and word recognition. This instrument is designed to assess code-based foundational literacy skills and serves as a screening tool, offering teachers valuable insights for instructional planning in preschool and PG and, for struggling readers, beyond.

3. Research aims and questions

This study aimed to assess PG students' ELS and their progress in the development of their ELS during PG depending on four hypothesized influencing factors.

The specific questions that we wanted to answer were:

Q1. How do children progress during PG in the following six ELS: concepts about print (CP), alphabet knowledge (AK), concept of word in text (CoW-T), phonemic awareness (PA), decoding (D) and spelling (S)?

Q2. Do a) ELS at the start of PG; b) previous attendance of preschool (PS); c) school attendance (SA); and d) socio-economic status (SES) influence children's progress in ELS and ELS at the end of PG?

4. Research methodology

4.1 Research design

To measure the changes in six emergent literacy skills (ELS) over the course of the PG year (Q1) and determine whether various factors have an influence on overall progress in ELS over the course of PG and final ELS (Q2), the present research design used a pre- and post-evaluation approach.

4.2 Sample and participants

209 PG teachers voluntarily enrolled in September 2023 in the Glittery Schools program, from across Romania, from schools serving low SES communities, of which 81% rural, located in 16 of 41 different counties of Romania. In total, data from 3,485 students were collected in a standardized form. After applying selection criteria: a) student's age (5-7 year olds), b) no reported developmental or learning disabilities that may affect literacy progress beyond the scope of typical ELS development, c) similar initial evaluation date (September-October 2023) and d) available results for both assessments, at the beginning and at the end of PG, a final sample of 2,134 students of 139 teachers was employed. Of these, 79% were from rural schools, 51% were girls, 87.5% had attended PS, and 47% received social scholarships in PG.

4.3 Data collection

Assessment at the start of PG

At the beginning of the program, teachers enrolled in the program participated in a 4-hour training session on the use of the ELS assessment tool (Temple & Temple, 2023). In addition to the training, teachers were provided with a video tutorial demonstrating how to administer the assessment. Before conducting the actual evaluations, the teachers performed 2-3 practice assessments and received any necessary clarifications.

The initial assessments took place in September-October 2023. In total, data from 3,307 students were collected in a standardized form. Besides the ELS scores, teachers were asked to provide the following information for each child assessed: age, gender, if he/she receives social scholarship and if he/she attended preschool. The data collected was pseudo-anonymised by teachers using unique codes for each student to ensure the confidentiality of data.

Assessment at the end of PG

The final assessments, using the very same instrument and the students' unique codes received in the pre-evaluation phase, took place in May-June 2024. In total, data from 2893 students were collected in a standardized form. Additional information regarding students' frequency of school attendance was collected.

Instrument:

The emergent literacy assessment instrument used to collect data was developed by Temple and Temple (2023) based on Marie Clay's Concepts about Print Test (Clay, 2000), Darrell Morris' beginning reading inventory (Morris, 2014), and the Yopp-Singer test of phoneme segmentation (Yopp, 1995). It consists of six main components that measure children's literacy level, namely: concepts about print text, alphabet and letter-to-sound knowledge, the concept of word in text, phonemic awareness, word recognition and spelling (see table 1). This instrument is an improved version of the earlier emergent literacy assessment instrument in Romanian described by Balea et al. (2023).

4.4 Measures

To test the research questions of the present study, we used the following measures:

EL measures:

Total ELS score (max=150 points, min=0 points) represents the total sum of the six component subscores listed in Table 1, calculated at the start of the school year (initial) and at the end (final).

Table 1

Measured components of emergent literacy

	What was measured in the emergent literacy assessment
Concepts about print (CP) (Max. subscore=6; min. subscore=0)	Knowledge of the lay-out of books; Knowledge that we read the print, not the pictures; Directional orientation of print on the page; Knowledge of the terms "word" and "letter" Ability to distinguish between upper and lower case letters
Alphabet knowledge (AK) (Max. subscore=93; min. subscore=0)	Recognition of letters of the alphabet, both upper and lower case, and production of letters, without regard to their case
Concept of word in text (CoW-T) (Max. subscore=12; min. subscore=0)	Knowledge that spoken language comes in units of words, and that those units are represented in print by clusters of letters separated by spaces; ability to track accurately between the words as they are spoken and the words as they are represented on the page
Phonemic awareness (PA) (Max. subscore=22; min. subscore=0)	Student's ability to segment two-, three- or four-phoneme words into their constituent phonemes
Decoding (D) (Max. subscore=12; min. subscore=0)	Students' ability to decode 2-3 letter words (CV, VC, CVC)
Spelling (S) (Max./min subscore=5/0)	Students' ability to spell 2-3 phoneme/ letter words (CV, VC, CVC)
Total ELS score: max=150; min=0	

Progress in ELS represents the difference between the total final assessment scores and the total initial assessment scores.

Explaining factors:

Categories based on initial total score represent the three groups of students defined by their total initial assessment scores: a) *lowest initial scores (LIS)* (<=30 points); b) *medium initial scores (MIS)* (31 – 90 points); c) *highest initial scores (HIS)* (>90 points). The categories were defined based on the observation that the median score in initial assessment was 28 (rounded up to 30) and on our previous study (Balea et al, 2023), adjusted for the different time frame for initial data collection.

*Preschool (PS) attendanc*e was determined based on information provided by the teachers about whether the student had been enrolled in preschool or not prior to PG, and the categories thus defined are: *PS attendant (PSA), PS non-attendant (PSnA)*.

Depending on their regularity of *school attendance (SA)*, students were grouped in three categories of attendance: a) *very good SA ("was absent rarely or not at all this school year")*; b) *good SA ("was absent occasionally this school year"*; c) *poor SA ("was absent very often this school year")*. Information about SA was provided by the teachers.

Socio-economic status was estimated using a proxy measure *the receipt of* a social scholarship in PG. Students who qualified for and received the scholarship were classified as having *low socio-economic status (LSES)*, while those who did not qualify or receive the scholarship were classified as having *non-low socio-economic status (nLSES)*.

4.5 Data analysis

ELS assessment results were analysed to explore progress in ELS and final ELS scores, as well as influences of the four hypothesized factors (initial ELS score, PS attendance, SA and SES).

Descriptive statistics were conducted to summarise children's ELS at the beginning and end of the PG and to describe the distribution of the explaining factors.

Inferential statistics: Repeated measures Welch ANOVA, with Games-Howell post-hoc tests, were conducted to compare pre- and post-PG evaluation scores, with explaining factors as independent variables, and to test for significant differences.

5   Results

This study explored preparatory grade (PG) students' progress in six emergent literacy skills (ELS) over the course of the school year, and how this evolution was influenced by four key factors: initial ELS measured at the start of PG, preschool (PS) attendance, school attendance (SA) in PG, and socio-economic status (SES). On average, students start at a total ELS score of 40.5 (27% of the maximum score of 150) and reach a total ELS final score of 117.9 points (78.6% of the maximum score), i.e. 51.6 percentage points. Progress in percentage points (pp) of the subscores for the six ELS is between 26.7 pp for concepts about print and 56 pp for spelling, with alphabet knowledge progress at 53.2 pp, concept of word in text progress at 47.5 pp, phonemic awareness progress at 49.1 pp and decoding progress at 52.5 pp. The lower progress in CP is not surprising as this skill

should be well developed in early childhood from interactions with children's books, which is normally done in preschool if not in the home. Spelling, on the other hand, is much less developed at the start of PG, as children draw and scribble in early childhood rather than spell, and also because invented spelling is not encouraged in Romanian preschools. The average total final ELS score (117.9) is very similar to what has been found before (Balea et al, 2023). Table 2 also shows differences in average scores by the four categories of students defined based on the investigated influencing factors.

Table 2

Initial and final results by components of emergent literacy and progress for each category of students

	CP (0-6 pts)		**AK** (0-93 pts)		**CoW-T** (0-12 pts)		**PA** (0-22 pts)		**D** (0-12 pts)		**S** (0-5 pts)		**Total score** (0-150 pts)		**P**
Categories	I	F	I	F	I	F	I	F	I	F	I	F	I	F	(pts)
Total (n=2134)	3.9	5.5	24.6	74.1	3.5	9.2	5.1	15.9	2.3	8.6	0.9	3.7	40.5	117.9	77.4
nLSES	4.6	5.9	33.3	82.4	4.5	10.3	6.5	18.1	3.1	10.5	1.2	4.2	53.3	131.5	78.3
LSES	3.7	5.5	15.6	66.9	2.4	8.1	3.5	14	1.3	8.2	0.5	3.3	27.1	106.1	79
PSnA	2.4	5.1	6.4	48.2	1.0	6	1.3	9.4	0.4	5.7	0.1	2.3	11.9	76.7	64.8
PSA	4.4	5.8	27.2	78.4	3.8	9.7	5.6	16.9	2.5	9.8	1	4	44.6	124.7	80
poor SA	2.5	4.8	6.4	36.3	0.9	4	1.2	7.2	0.4	3.5	0.1	1.6	11.7	57.4	45.7
good SA	3.7	5.5	17	64.8	2.6	7.7	3.4	13.2	1.1	7.7	0.5	3	28.3	101.9	73.5
very good SA	4.5	5.8	28.8	82.2	3.7	10.1	5.5	17.6	2.6	10.3	1	4.2	46.1	130.2	84.1
LIS (<=30 pts.)	3.4	5.5	6.5	62.7	1.3	7.6	1.2	12.7	0.2	7.6	0.1	3	12.6	99	86.4
MIS (31 <=90)	4.9	5.9	34.3	84.9	4.9	10.7	7	18.7	3	10.9	1.2	4.4	55.2	135.8	80.6
HIS (>90 pts.)	5.6	6	73.6	91.6	9.1	11.6	15.9	21.1	9.1	11.8	3.8	4.9	117.2	147.1	29.9

Note: I = initial score; F = final score; P = progress; pts = points

5.1. Progress in Emergent Literacy Skills (ELS)

The overall mean progress in total ELS score, on a scale from 0 (minimum) to 150 (maximum) was 77.4 points (initial average total score: 40.5, final average total score: 117.9). Not counting HIS, where the ceiling effect of the assessment instrument was obvious (see Table 3), with the median (50th percentile) already at the maximum score, the most progress was made by the LIS (86.4 points), who started from an average initial score of 12.6 and reached an average of 99 points at the end of PG. This final score, however, is very similar to merely the 25th percentile of the entire sample's final score (100 points), indicating that students under this score should be receiving additional support for good progress in literacy beyond PG.

Table 3

Percentiles of initial and final ELS scores and final ELS scores by categories of students' initial ELS scores

Percentiles	5	10	25	50	75	90	95
Initial_ELS score, all (n=2134)	2	4	10.5	28	61	99.6	121
Final_ELS score, all (n=2134)	23	46	100	138	150	150	150
Final ELS score LIS (<=30 pts.)	13	23	61	112	141	150	150
Final ELS score MIS (31<=90 pts.)	86.6	108	131	145	150	150	150
Final ELS score HIS (>90 pts.)	134.2	140	147	150	150	150	150

5.1.1. *Progress in concepts about print (CP)*. The average initial score for the entire sample was 3.98 points (66.3% of the maximum score of 6), PSnA and poor attendants having the lowest starting CP score (2.49 points, and 2.52 points respectively), and nLSES students the highest (4.62 points, 77%). While PSnA recorded the highest progress in this subskill (gaining 2.6 points), their final score of 5.1 (85%) was still below the average final CP score for the entire cohort (5.58 points, 93%). The poor attendants also had above average progress (2.28 points), but their final score (4.8 points) was the lowest of all categories.

HIS students reached the maximum score (6) by the end of PG, having had the highest initial CP score (5.6 points) and. The fact that this was the only group that reached the maximum score indicates that in all other categories there were still students at the end of PG who were not aware of all the measured concepts about printed text (see Table 1).

5.1.2. *Progress in alphabet knowledge (AK)*. On average, students made a 49.5-point gain in AK, with an average starting score of 24.6, and a final score of 74.1 (on a scale from min=0 points to max=93 points). LSES and nLSES students had a similar progress, somewhat bigger for the LSES group (51.2 vs. 49.07). PSAs had a significantly better starting score (27.2 points) and better progress (51.1) as compared to PSnAs (6.4 points initial score, and a 41.7-point progress). The highest progress (56.2 points, from 6.5 points to 62.7 points) was recorded by LIS students. Except for the HIS students, whose progress was affected by the ceiling effect, the lowest progress in AK was recorded by students with poor SA (29.8 points), who also had the lowest starting score in AK (6.4 points). SES does not seem to impact progress in AK.

AK is known to be the focus of instruction in PG in Romania (Balea et al, 2023) and this ELS has the biggest share of the final score (93 points out of 150). The effects of SA on the AK score are markedly visible: children with very good SA reached an 82.2-point score, gaining an extra 53.4 points of their final score on account of AK, outperforming children with good SA (64.8 final score, 47.8 progress) and those with poor SA (36.3, 29.9 progress). This ELS score is not only significant in itself, but – along with CoW-T and PA) it further impacts decoding (D) and spelling (S), and therefore it should be expected that

scores on AK will be directly proportionate with D and S scores. However, this correlation is not examined in this paper.

5.1.3. *Progress in concept of word in text (CoW-T)*. On average, students progressed by 5.7 points, within the range from 0 to 12, from a starting average score of 3.5. Students with poor SA had the lowest progress (3.08 points), while those with very good SA made the biggest progress (6.4 points). A marked difference in progress occurred between PSAs (5.84 points progress) and PSnAs (4.98 points), with PSAs reaching a final score of 9.7 as compared to 6 points for PSnAs. SES status does not seem to impact progress in CoW-T score, however, the final scores of the two categories are evidently different: 10.3 for nLSES and 8.1 for LSES. SA also has an evident impact on both progress in CoW-T and the final scores, students with very good SA reaching a final score of 10.1 (6.4 progress) and those with poor SA reaching a final score of 4 (3.1 progress).

Pointing at words while pretend-reading, in fact reciting, a rhyme is an important measure of foundational ELS, showing the extent to which children are aware that text on the page is the spoken language represented in writing. Not even the HIS students reached the maximum score, suggesting that instruction should pay more attention to CoW-T.

5.1.4. *Progress in phonemic awareness (PA)*: Students had a mean progress of 10.8 points, within the range from 0 to 22, with a starting score of 5.1. SES seems to have an effect on progress in PA, LSES progressing 10.5 points (initial score: 3.5, final score: 14.0), while nLSES students gained an additional 11.6 points (initial score: 6.5, final score: 18.1). PS attendance also influences both the starting score and progress in PA, with PSAs starting at 5.6 and gaining 11.3 points, and PsnAs starting at 1.3 and gaining 8.1 points. LIS students started at the same level as poor SAs (1.2 points), but while the former gained 11.5 points, the poor SAs gained only about half of that (6 points). The highest progress in PA was achieved by very good SAs (12.1 points).

HIS students did not reach the maximum score, their final score of 21.1 indicating that not all of them could segment correctly 2- to 4-phoneme words. The percentage of their final PA score out of the total maximum score (21.1 out of 22) is the lowest (95.9) as compared to the percentages reached in the other measured ELS: CP (100%), AK (98.5%), CoW-T (96.7%), D (98.3%) and S (98%). This may suggest that PA still receives insufficient attention although teacher training and learning materials encourage focus on PA.

5.1.5. *Progress in decoding (D)*: The average progress in decoding skills (scores ranging from 0 to 12) was 6.3 points, from an average starting score of 2.3. The highest initial and final scores were of the HIS (initial score: 9.1, final score: 11.8). The lowest initial score was 0.2 of the LIS students who, however, gained more points (7.4) in PG than the average (equalling the progress score of nLSES students), but only reached a final score of 7.6

(compared to the nLSES, who reached 10.5 points). PSnAs and students with poor SA had a low staring score as well (0.4), but while PSnAs progressed to a final score of 5.7, the poor SAs only reached a final score of 3. PSAs not only started much better than PSnAs (initial scores of 2.51 and 0.4, respectively), but they also progressed much better (6.9 point progress) than PSnAs (5.2 point progress). There are also marked differences between the groups of nLSES and LSES: the former started at 3.12 and gained 7.4 points, while the latter started at 1.34 and gained 6.9 points.

Decoding skills are expected to reflect mastery of AK and PA, however, in this article we do not have the space to discuss the extent to which D is impacted by AK and PA.

5.1.6. *Progress in spelling (S)*: An average progress of 2.8 points was recorded in S (score range 0 to 5), with an initial score of 0.9. The highest initial and final scores were of the HIS (initial score: 3.8, final score: 4.9). The lowest initial was 0.1 of the LIS students who gained about the same number of points (2.9) in PG as the average (equalling the progress score of nLSES students), but only reached a final score of 3 (compared to the nLSES, who reached a final score of 4.2). PSnAs and students with poor SA had a low starting score as well (0.1), but while PSnAs progressed to a final score of 2.3, the poor SAs only reached a final score of 1.6. PSAs not only started much better than PSnAs (initial scores of 1 and 0.1, respectively), but they also progressed much better (3-point progress) than PSnAs (2.1 point progress). There are also evident differences between the groups of nLSES and LSES: the former started at 1.2 and gained 2.9 points, while the latter started at 0.5 and gained 2.7 points.

Similar to D, spelling skills are expected to reflect mastery of AK and PA, but in this article we do not have the space to discuss the extent to which S is impacted by AK and PA.

5.2. Influencing factors

PG students' final scores in ELS were significantly influenced by each of the four factors studied, and their progress in ELS was also significantly influenced by their PS attendance prior to PG, their SA and their starting scores. However, rather surprisingly, in this sample, we found no influence of SES on the size of progress in ELS over the course of PG (Table 4). Interpretation of these results should consider that SES was measured using a proxy.

5.2.1 *Initial total score*. Students' progress in ELS was analysed by grouping students depending on their initial assessment scores into students with low initial scores, students with medium initial scores and students with high initial scores. ANOVA results showed significant differences between the LIS, MIS, and HIS groups' initial scores (F = 7312.0, Welch=6109.7, $p < 0.05$), highlighting the varying levels of progress based on initial scores. ANOVA results also indicated that the differences in progress across these three categories of students were statistically significant (F =280.4, Welch= 834.9, $p < 0.05$). Of the three categories, LIS students made the most progress.

Table 4

Results of Welch ANOVA for Differences in ELS Scores Across Explaining Factors

		F test	Sig.	Welch Test	df1	df2	Sig.
Socio-economic status	Initial Assessment Total score	273.9	0.00	561.0	1	686.6	0.00
	Final Assessment Total score	225.8	0.00	253.6	1	301.5	0.00
	Progress Score	0.2	0.66	30.1	1	320.5	0.00
	Final Percentage achieved of Total	225.8	0.00	253.6	1	301.5	0.00
Preschool attendance	Initial Assessment Total score	189.9	0.00	183.6	2	447.4	0.00
	Final Assessment Total score	376.2	0.00	256.5	2	291.8	0.00
	Progress Score	34.6	0.00	79.5	2	323.2	0.00
	Final Percentage achieved of Total	376.2	0.00	256.5	2	291.8	0.00
School attendance	Initial Assessment Total score	80.3	0.00	183.6	2	447.4	0.00
	Final Assessment Total score	331.1	0.00	256.5	2	291.8	0.00
	Progress Score	73.4	0.00	79.5	2	323.2	0.00
	Final Percentage achieved of Total	331.1	0.00	256.5	2	291.8	0.00
Initial score categories	Initial Assessment Total score	7312.0	0.00	6109.7	2	599.4	0.00
	Final Assessment Total score	337.4	0.00	618.9	2	1393.8	0.00
	Progress Score	280.4	0.00	834.9	2	1004.7	0.00
	Final Percentage achieved of Total	337.4	0.00	618.9	2	1393.8	0.00

Starting from an average of 12.6 points, these students gained an average of 86.4 points in PG (cf. overall average progress of 77.4 points), which was the highest progress. This indicates a strong improvement, with students in this group benefiting the most from the literacy instruction and interventions during PG. MIS students also demonstrated strong progress, improving by 80.6 points. Their average initial score (55.2) positioned them well above the median total initial score (28 points), and much above the LIS group (12.6 points), but also much below the HIS group (117.2 points), indicating they had ample room for improvement. Their progress suggests that PG was similarly effective in building on their foundational literacy skills, pushing them toward higher levels of proficiency and evidently reducing the gap between them and the HIS group at the end of PG (average final score for MIS – 135.8 points compared to average final score for HIS – 147.1 points). Students with the HIS (91-150 points) exhibited the smallest progress, gaining 29.9 points on average, having started from an average of 117.2 points and reaching the highest final score (147.1 points). This smaller improvement is likely due to the ceiling effect, these students having less room for growth

on the measures of the present study. Many of the ELS components may have already been mastered by these students at the beginning of PG, so their progress was naturally limited compared to the other groups.

In the final assessment, the maximum score of 150 points is reached at the 75th percentile, which means that at least 25% of the students are perfectly prepared for grade 1 in terms of total mastery of code-based ELS. On the other hand, for students who are below the 25th percentile (below 100 points) in the final ELS assessment, additional support should be provided; otherwise, their progress in grade 1 is likely to be unsatisfactory.

The maximum score of 150 points was reached by at least half of the students in the HIS group, by over 25% the MIS students and by over 10% of the LIS. The value of the 10th percentile of the HIS students is approximately the same as the value of the 75th percentile of the LIS.

5.2.2. *Preschool attendance*. PSAs entered PG with stronger literacy foundations (44.6 points) and made greater progress (83.1 points) reaching a final score of 124.7 points, compared to PSnAs, who had an initial score of 11.9, and a final score of 76.7 points, gaining 64.8 points in PG. ANOVA results indicated a significant difference between the PSAs and PSnAs, with PSAs making significantly greater progress (F = 34.6, Welch=79.5, $p < 0.05$). This indicates that early childhood education plays a critical role in setting the stage for later literacy development. PSnAs not only had significantly lower ELS but also made significantly less progress in PG than their PSA peers.

5.2.3. *Socio-economic status*. LSES students started with a much lower average initial score (27.1 points), and their average final score at 106.1 points remained much below the nLSES students' score (131.5 points), although both groups made nearly identical progress (79 points for LSES and 78.3 points for nLSES). ANOVA results showed no significant difference in progress between LSES and nLSES groups ($p > 0.05$), suggesting that SES did not influence literacy growth in PG. This suggests that the PG instruction received had no effect on closing the gap in ELS accounted for by SES. On the other hand, it did potentially prevent the widening of the gap. Unlike previous studies in Romania (Dolean et al, 2019), which found that SES affected primary students' progress in reading beyond differences due to initial reading levels, our study did not find any significant differences in progress in ELS in the course of PG on account of SES. This is not to say that different growth rates may not appear later, however. In addition, our study was conducted on a group of students who received literacy learning materials and who were instructed by teachers trained specifically to help them have a good start in PG.

5.2.4. *School attendance*. Students with very good SA had the highest average initial score (46.1 points) and the most progress (84.1 points) of the three categories defined based on school attendance, also reaching the highest total final ELS score (130.2 points) of the three categories of SA. The ANOVA analysis revealed significant differences in progress between the SA groups (F = 73.4, $p < 0.05$), with better attending students making significantly more progress. The group with good SA had a starting score of 28.3

points and gained 67.9 points, which led to a total final score of 101.9 points. Students who missed school very often (poor SA) started at the lowest level of the three groups (11.7 points) and gained the fewest points (45.7 points) ending PG with a total score of 57.4 points. These results highlight the importance of consistent SA for literacy development in PG, and the implication is that schools need to proactively support improvement in SA. If screening or initial assessment of ELS is performed, then teachers will know that students who have the lowest starting scores are also likely to develop poor attendance unless efforts are made to ensure early successful literacy learning experiences, which may act as a motivating factor for SA.

6. Discussion

As stated previously, the present study aimed to answer two questions: 1. How do children progress during PG in six broadly accepted ELS measures, skills that the national curriculum for PG also mandates: concepts about print (CP), alphabet knowledge (AK), concept of word in text (CoW-T), phonemic awareness (PA), decoding (D) and spelling (S)? 2. Do a) ELS at the start of PG; b) previous attendance of preschool (PS); c) school attendance (SA); and d) socio-economic status (SES) influence children's progress in ELS and their ELS at the end of PG?

The answer to the first question is that, overall, students progress from 40.5 points (27% of the maximum score of 150) to 117.9 points (78.6% of the maximum score), i.e. 51.6 percentage points. Progress in percentage points (pp) of the subscores for the six ELS is between 26.7 pp for concepts about print and 56 pp for spelling, with alphabet knowledge progress at 53.2 pp, concept of word in text progress at 47.5 pp, phonemic awareness progress at 49.1 pp and decoding progress at 52.5 pp.

As concerns the four hypothesised influencing factors, progress in ELS has been found to be being significantly influenced by previous attendance of preschool and school attendance in PG, as well as ELS at the start of PG, but not SES. Children's final scores were however influenced significantly by all four investigated factors.

6.1 Pedagogical implications

Our study leads to the conclusion that there are specific pedagogical implications related strictly to literacy instruction in PG, as well as some more general pedagogical implications.

The fact that at the end of PG only one category of students – HIS – demonstrated that they were aware of all the measured basic concepts about print suggests CP needs more attention in PG. Although sets of 10 books were provided for each child, and training for teachers including how to use these children's books, instruction may not have paid enough attention to this basic emergent literacy skill. Children who did not attend PS and those with LSES are likely to have had limited interactions with books prior to PG, as suggested by their low CP initial scores and below average final scores. In order to become competent readers, children need to interact with books as early as possible, but

in PG at the latest; teachers should ensure that books not only are available for children, but that they are supported in becoming aware of the specific aspects of children's books.

AK is clearly the focus of instruction in PG. However, the fact that other essential ELS such as the concept of word in text and phonemic awareness are not mastered fully, not even HIS students reaching the maximum score, suggests that instruction should focus more on these ELS. Especially PA should also receive more attention, as suggested by the fact that HIS students are the farthest, out of all considered ELS, from totally mastering this particular ELS (their final score is 95.9% of the total score of 22 points for PA, the lowest among all the measured ELS). PA training, especially when practiced with letter-sound associations, helps children decode by enabling them to break words into phonemes and map those phonemes to corresponding letters. Moreover, in transparent orthographies such as Romanian, PA is a strong predictor of reading success, as decoding is more straightforward compared to opaque orthographies.

Assessment of specific ELS skills – if done individually, with each students in the class, in the first weeks of PG – can clearly inform the teacher about students' literacy instruction needs. Early identification and targeted support for struggling readers are essential. This study shows that students who entered PG with the most limited literacy skills made the most progress when provided with the right instruction such as in Noi Orizonturi Foundation's program. To maximize these gains, teachers should implement screening and diagnostic assessments early in the year to identify students in need of additional help. Especially students up to the 25th percentile (with approximate starting ELS scores of maximum 10) would benefit from targeted interventions, such as small group instruction, individualized tutoring, or other forms of additional practice with foundational literacy skills.

The study highlights the importance of differentiated instruction in addressing the diverse literacy needs of students. We found that students enter PG with broadly different ELS, and while those who started with the lowest initial scores showed the highest progress (86.4 points for the lowest scores group compared to 80.6 for the medium scores group; the highest scores group's progress being limited by the ceiling effect of the measures), the final ELS scores of the lower starters (99 points) remained much lower than those of the medium scores group (135.8) and of the highest scores group (147.1), with the lowest group not managing to reach the highest scores group's initial score (117.2) and being similar merely to the 25th percentile of the final total score for the entire sample (100 points). This suggests that teachers should focus on foundational skill-building for students who start at a lower level while providing more advanced literacy activities for higher-achieving students to maintain their engagement and growth. Tailoring instruction to individual student needs is likely to ensure that all learners can make meaningful progress throughout the year.

The fact that in the final ELS assessment 25% of the students reached the maximum score of 150 points, and another 25% had final ELS scores of up to 100 points (Table 3) signalling their need for additional support for success in grade 1 may suggest that

cooperative learning groups with heterogeneous composition could be set up so that the more advanced students would support the less advanced ones including in their literacy class. Notwithstanding, additional resources are certainly necessary beyond cooperative learning and other approaches of differentiated instruction out of class as well (e.g. support teachers for small group or one-on-one tutoring), especially for the students up to the 10th percentile.

Consistent school attendance is crucial for literacy skills development. Students with very good SA in PG made much greater progress in their ELS (84.1 points) than those with good SA (73.5 points) and those with poor SA (38.3 points). Moreover, low initial ELS seems to predict school attendance: students with poor SA had not only the lowest final scores (57.4 points), but also the lowest initial ELS scores (11.7). Teachers – and schools – can expect that children with low initial ESL are likely to have poor attendance unless support is provided for their early success in ELS. Hence, the importance of promoting not only regular attendance but also ensuring that students who start with low ESL receive the necessary support in a timely manner to reduce the gap between them and their more advanced peers as early as possible.

6.2 Policy implications

Based on the findings of this research, several policy implications can be derived to improve early literacy outcomes in PG students, especially for those from disadvantaged backgrounds. As vulnerabilities appear to overlap largely (LSES, PSnA, poor SA, LIS), all these factors should be considered in attempts to prevent failure in literacy skills development.

Regular literacy assessments from preschool through PG can help identify at-risk students early and tailor – as well as provide the necessary – interventions for better progress in PG. Data should inform differentiated literacy instruction in the classroom, and resource allocation at school level to optimize outcomes, including individual or small group support in school or other community settings outside the classroom. For LSES students, early intervention is particularly important, and it should be based on thorough assessment of ELS. Although these children start with lower literacy skills, they can make equal progress with their nLSES peers, provided they are given the right support. Free literacy resources, along with well-structured programs and well-trained professionals are critical for helping these students catch up, especially in rural areas where access to educational resources may be limited.

Preschool attendance plays a crucial role in boosting initial literacy skills, especially for LSES children. Policy measures are therefore needed beyond the existing ones to increase enrolment and attendance in order to give all children a strong foundation for success in preparatory grade (PG). Engaging parents and securing support from social services and community organizations have been reported to yield good results in preschool attendance. Preschool can also be the environment where parents/ carers can learn to support their children with early literacy skills.

Regular school attendance remains a key factor in literacy development. Absenteeism can severely hinder progress in literacy skills development. National, but also local policies focused on support measures are needed to proactively identify and remove barriers which prevent children from attending school. In this case, too, engaging parents/carers and the school community are crucial. Schools in disadvantaged communities most likely require additional resources to keep students consistently engaged in their education.

Finally, improving early literacy instruction is essential to bridging the gap between students, which can sometimes span more than a year. Enhancing teacher training, utilizing effective literacy assessments, and providing access to educational resources will equip educators to better support students' literacy growth, ensuring that no child risks failure in literacy. As concerns instruction, although we did not find that the PG instruction provided in "Glittery Schools" had any effect on closing the gaps in ELS accounted for by SES, LSES and nLSES having progressed the same but from significantly different staring points, it did potentially prevent the widening of the gap between different SES students. This would be a plausible explanation given the aims of the "Glittery Schools" program, which provided not only free literacy resources but also training and substantial support for teachers.

6.3 Limitations of the study and directions for future research

Despite the large data set of 2134 children, the present study relies on a convenience sample, consisting of teachers that voluntarily enrolled in the Glittery Schools program, who were already aware of the difficulties in teaching all children to read and write. These teachers received instruction on how to develop ELS. There is no data to compare how children progress in PG in a regular setting with teacher-administered assessments and self-reported data, which could introduce biases due to variations in how teachers conducted and scored the assessments, despite the one-day training.

The study tracked literacy progress only during the preparatory grade (PG), providing insights into one academic year, not addressing how these gains impact long-term academic performance. Additionally, with 83% of the sample from rural areas, the findings may not be generalizable to urban settings with different literacy challenges. While key factors like PS attendance, SES, and SA were considered, other important influences, such as home literacy practices, parental involvement (which have strong connections with SES), and teacher experience, were not included.

Future studies should explore instruction practices in ELS development, as well as the extent to which – and the manner in which – especially the ELS that are less commonly part of instruction in PG in Romanian classrooms, such as CP, CoW-T and PA, are addressed.

Conclusions

The study highlights the critical role of the preparatory grade (PG) in developing emergent literacy skills (ELS) among young learners, particularly for those from disadvantaged backgrounds. Key findings suggest that preschool attendance, regular school attendance, and targeted support for students from low socio-economic status (SES) backgrounds are essential for maximizing literacy gains.

Preschool attendance provides a strong foundation for literacy development, and expanding access to high-quality early childhood education is crucial, especially in rural and disadvantaged areas. Consistent school attendance significantly influences progress, underscoring the need for policies to address chronic absenteeism, which disproportionately affects students from low SES backgrounds. Additionally, differentiated instruction is necessary to ensure that both low- and high-achieving students are sufficiently supported and challenged.

Lastly, a data-driven approach is essential for early identification of struggling readers and for designing effective literacy interventions. Regular assessments from preschool through PG can inform policy decisions and resource distribution, ultimately helping to close the literacy gap and promote long-term academic success.

In summary, ensuring equitable access to early literacy support, promoting regular school attendance, and empowering teachers with continuous professional development are key to improving literacy outcomes and reducing disparities in early education.

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Recovery of Literacy Skills in Primary Education in Romania. Potential Systemic Solutions

Bianca-Andreea HURJUI•

Abstract

Despite recent interventions aimed at reducing inequity in the Romanian education system, educational gaps persist and, in some respects, are even widening. International assessment results indicate significant disparities in student performance. These same gaps are also evident in national testing. In this context, targeted interventions from the early years of schooling become not just an educational necessity but a social urgency. The long-term effects of low literacy levels are felt both individually, socially, and economically. This study explores the effectiveness of two intervention methods aimed at recovering literacy skills for primary school students: intervention by a specialist working with students who have skills below their grade level and recovery intervention conducted by the classroom teacher, supported through a training and mentoring program. The main objective of the study is to determine the most effective solution for recovering literacy skills for primary school students from vulnerable backgrounds. The study was conducted on a sample of 146 primary school students. The students were divided into two groups: 18 students who worked with an external specialist in the recovery program and 129 students who worked with classroom teachers after school hours. The classroom teachers were included in a training program as part of the support offered to teachers by Teach for Romania. To evaluate the students' progress, initial and final tests were administered during the 2023-2024 school year. The results suggest that both approaches generates an increase in students' skills, but the effect generated by the specialist's intervention is statistically significantly greater.

Keywords: recovery intervention, literacy skills, vulnerable backgrounds

Introduction

Learning to read and write is a very complex process that involves a series of other cognitive processes: attention, memory, language, and motivation (Snow, Burns and Griffin, 1998). Beyond their cognitive aspects, reading and writing are inherently social activities. These activities are part of the lives of children and adults to varying degrees, being sensitive to the social and cultural universe in which individuals are situated.

• PhD Student SNSPA and Literacy Coordinator Teach for Romania, Bucharest, Romania, bianca.hurjui@teachforromania.ro

Learning to read itself involves a series of acquisitions which in the specialized literature are found under the concept of emergent literacy. Emergent literacy involves the existence of reading and writing experiences from very early ages, before children actually learn to write and read (Sulzby, 1991). For some children, these experiences are rich enough, both in terms of variety and quality, while for others they are so limited that they cause major difficulties in acquiring reading and writing skills. These difficulties are especially encountered in children from socio-economically vulnerable backgrounds and tend to persist over time, even deepening, as can be seen from the latest analyses of international tests. Thus, for some students, differentiated instruction through recovery programs becomes not just necessary but urgent. Children who have missed the start in acquiring reading and writing skills need recovery programs and well-prepared and competent teachers to provide the support they need.

A recovery program is an early preventive intervention program designed to accelerate the progress of readers who have not managed to learn to read after formal instruction (Clay, 1991). In Romania, these recovery programs have become more "popular" after the crisis generated by Covid-19 pandemic. Recovery programs were carried out by classroom teachers -generally without additional training, support, or specialization in the area of recovering reading and writing skills - and they have never been subjected to an analysis to determine their added value. However, the new legislative provisions in Education Law no. 198/2023 tend to provide a favourable framework for implementing these programs by: specifying the continuation and expansion of remedial learning programs in schools for students struggling to acquire skills and for Romanian students returning from abroad, as outlined in Article 75 of Law no. 198/2023; as well as through the National Teacher Training Program aimed at increasing students' level of functional literacy, specified in Article 105 par. (10) of the same law. Additionally, the operation and management of the functional literacy platform are detailed in Article 98 par. (9). Currently, by means of Emergency Ordinance No. 115/2023, the implementation of the provisions of Article 105 par. (10) of Law no. 198/2023 has been suspended by the Government and the teacher training program is scheduled for the 2025–2026 school year. That being said, it should be stated however that Law no. 198/2023 does not provide any information regarding the content of the National Teacher Training Program, apart from the institution responsible for developing this program, the National Center for Teacher Training and Career Development, an institution also introduced by Education Law no. 198/2023.

Nevertheless, a series of questions remain: who will conduct these remedial programs at the school level? Who and how will teachers be trained, and has the alternative of piloting remedial intervention programs with specialists at the school level been considered? The present study does not provide answers to these questions but offers a clear understanding of the direct, tested impact that teachers (supported through training and mentoring programs) can have on recovering literacy skills for students from vulnerable backgrounds, as well as the impact of specialist intervention in

recovering literacy skills in students. The goal is to identify the most viable solution in terms of the results generated for students.

Literature Review

In general, the teaching of reading and writing in the Romanian context is based on the phonetic approach. This means that initially the child learns the sounds, the relationship between sounds and letters, so that later they can decode words.

A less commonly used approach in the national context, but one that recognizes the complexity of the reading process, emphasizing that reading is not just about decoding sounds but also about understanding and context, is the holistic approach to reading. This includes vocabulary development, critical thinking, and interpretation skills. International literature has conceptualized various models that include these approaches. Some of the most well-known are the Simple View of Reading (SVR) (Gough and Tunmer, 1986), later translated and enriched in Scarborough's model (Scarborough, 2001), and the Active View of Reading, AVR (Duke and Cartwright, 2021). The Active View of Reading model has been used in research addressing disparities in student outcomes based on economic or racial criteria, bringing the concept of social justice to the forefront. The study conducted by Burns, Duke, and Cartwright (2023) justifies how knowledge of the components of the latest models of reading and writing learning can contribute to reducing inequities. Meanwhile, in Romania, learning to read and write has been considered a process that happens on its own. Students go to school and learn to write and read. In some cases, this indeed happens, while in others, general instruction seems to fail to yield results. There are a few studies, such as those conducted by Dolean (2019), which highlight the explanatory power of socio-economic factors in the acquisition of reading and writing skills, demonstrating that students from vulnerable backgrounds have a slower pace compared to their peers from economically advantaged families. Thus, from the moment they enter kindergarten, children have certain "chances" of acquiring literacy skills and, consequently, certain chances of success as adults (Smart, et al., 2017). To balance the scales and increase the chances of success, some children need additional attention and differentiated instruction. Other international researches consider that the quality of instruction is often the strongest predictor of student outcomes, surpassing the effect of factors such as life experience given by the economic context or differences between schools (Burchinal, et al., 2011). From this perspective, recovery programs for children from vulnerable backgrounds could be considered affirmative measures that would correct inequity. They can have this status only to the extent that we are dealing with a certain degree of instructional quality. Quality that is difficult to measure because these children are often, even from the preparatory class, in the classes of teachers with whom they do remedial work. Of course, we do not minimize the contributions of economic factors or the problems they generate: absenteeism, grade repetition, we just emphasize that there is a need for teacher training to face these challenges, that they could not address during class hours, through a recovery program tailored to the child's

needs. An interesting recent national study by Balea, Kovacs, and Temple (2023) suggests that teacher training interventions and the use of appropriate materials have significant effects on the literacy levels of students in preparatory grade from vulnerable backgrounds. Using a comparative analysis, the authors demonstrate that there are significant differences in the outcomes of students who received proper training and those who received traditional instruction in learning to read and write.

A recovery program is an early preventive intervention program designed to accelerate the progress of readers who have not managed to learn to read after formal instruction (Clay, 1991). Research has shown that these programs can have positive effects at a general level on children's reading performance, but also specifically on reading fluency and comprehension, especially for beginning readers (Fahle, Kane, Reardon and Staiger, 2024). Recovery programs involve individual or small group sessions with students, tailored to their needs. Needs are identified through an individual assessment that measures both the specific dimensions of emergent literacy: the concept of print, alphabet recognition and reproduction, word recognition, phonemic segmentation, and word spelling, as well as the level of competence in each of the five dimensions of literacy: phonological and phonemic awareness, decoding and grapheme-phoneme correspondence, vocabulary, comprehension, and fluency.

In the United States, these recovery programs are part of the university training of teachers, in addition to continuous training. For example, Reading Recovery was developed in the 1980s by Dr. Marie Clay, a researcher from New Zealand, and is implemented in many schools in the United States and other countries, being a model of intervention used by various school districts. The program itself involves a year of dedicated training for instructors, both theoretical and practical training. In Romania, such programs have not been explicitly addressed in university programs. They are tangentially included in specializations such as special psychopedagogy. The effects of the recovery program have been demonstrated since 1988, through research initiated by Pinnell, DeFord, and Lyons (1988), which showed a statistically significant effect on comprehension, followed by research by Pinnell et al. (1994) and Schwartz (2005), which clearly demonstrated the improvement of fluency for beginning readers. Improving fluency, as shown by the studies conducted, leads to improved reading performance and subsequently text comprehension. There is research that has shown that students who read below grade level at the end of third grade are four times less likely than their peers with grade-level skills to graduate from high school (Balfanz, Bridgeland, Bruce and Fox, 2013). Thus, literacy skills can be treated as effective tools for acquiring, organizing, and applying information in various fields. As such, the ability to read and understand written materials is a transdisciplinary competence and an essential condition for success in school and later in life.

In the international specialized literature, there is a generous body of research that follows the predictors that lead to or jeopardize the formation of literacy skills in students. In addition to socio-economic factors and the quality of teaching, metacognitive

strategies, reading speed, and the number of books students have at home seem to predict their level of comprehension (Artelt, Schiefele, & Schneider, 2001), along with psychological aspects such as motivation for reading or technical aspects: vocabulary size and word reading. In the national context, research has focused on economic predictors (Dolean, Melby-Lervåg, Tincas, Damsae, & Lervåge, 2019). The purpose of this study is not to identify those predictors that can influence children's literacy skills but to present an analysis that primarily aims to find the most effective intervention method for recovering literacy skills for primary school students. Thus, we test two intervention models: specialist intervention and classroom teacher intervention, who undergo training and mentoring programs to implement the recovery program for their students.

Research Methodology

Starting from the premise that there is a need for literacy recovery programs for those students who, for various reasons, are unable to write or read by the end of the fundamental acquisition cycle (end of second grade), the main objective of this study is to determine the most effective solution for recovering literacy skills for primary school students. In this context, two types of interventions were tested: the intervention conducted by the classroom teacher, supported through training and mentoring, and the intervention by an external specialist. Thus, we had two secondary objectives: the first focused on analysing the impact of teacher training and mentoring on the outcomes of students with difficulties in acquiring reading and writing skills, while the second aimed to evaluate the contribution of an external specialist to the recovery of reading and writing skills for primary school students with difficulties. Thus, the main research question around which the entire research endeavour was conducted is whether there are significant differences between students who work with an external specialist and students who work with the classroom teacher in recovering literacy skills. In this regard, we formulated the following hypotheses:

H1: Students with gaps in reading and writing skills who work with an external specialist will show significant and possibly greater improvements than students who work with the classroom teacher.

H2: The training and mentoring program offered to teachers will have a positive impact on the results of students selected for literacy recovery programs.

H3: There are significant differences between the two groups of students.

The research design employed is quantitative, featuring a quasi-experimental, comparative approach between two groups. At the beginning of the 2023-2024 school year, an initial assessment was conducted for 1,143 primary school students in the classes of teachers supported by the Teach for Romania organization, using tools developed by the Noi Orizonturi Foundation: the Informal Reading Inventory and the Emergent Literacy Assessment Workbook. The evaluation aimed to identify the literacy level of each assessed student (the grade level they were at compared to their current grade). The Emergent Literacy Assessment Workbook was designed based on

internationally recognized tools, such as the one developed by Marie Clay (2019), and assesses students' literacy levels across five dimensions: concepts about print, alphabet and letter-to-sound knowledge, the concept of word, phonemic awareness, and word recognition. The Informal Reading Inventory is grounded in the work of Darrell Morris (2014) and measures several key aspects of children's reading skills from the beginning of Grade 1 to the end of Grade 4, as follows: word recognition (both highly familiar words recognized instantly and decoding of words, *i.e.*, using letter-sound correspondence skills), reading fluency, comprehension of read text, comprehension of heard text, reading levels, and word spelling. The inventory consists of word lists, reading passages, and questions, all carefully graded by difficulty level.

Of the 1143 initially evaluated students, a sample of 129 second to fourth-grade students who needed urgent literacy recovery intervention was selected based on the evaluations, having skills at least two grades below their current grade level. Eliminating evaluation errors, we selected a subsample of 56 students who were evaluated at both T1 (end of the school year), constituting Experimental Group 1, the group of students who worked in the recovery program with classroom teachers.

Experimental Group 2 consists of students who worked with an external specialist in a pilot literacy recovery program conducted at the school level. The program involved evaluating all students in the school using the aforementioned instruments, which allowed the identification of a group of 18 primary school students who needed support in recovering skills, being at least two grades behind their current grade level. From these, we selected a subsample of 9 students who were evaluated both initially and finally.

 The actual intervention consisted of conducting remedial programs. Students in Group 2 worked with the specialist, while students in Group 1 worked with the classroom teachers. The teachers underwent a training program that included both synchronous online training sessions on the Zoom platform, eight in total, and mentoring, which consisted of at least six 1:1 work sessions aimed at interpreting initial evaluation results, creating a personalized intervention plan, implementing the individual plan, adjusting it based on student results, and final evaluation of results. The intervention took place over seven months: October 2023 - May 2024.

For data analysis, specific statistical procedures were used to measure results, compare initial and final outcomes, as well as to compare the two samples, performed using the Excel application.

Research Results

At the level of the entire sample of 129 students who were significantly behind by at least 2 grades compared to their current grade level, an average difference of -2.75 was recorded in the initial evaluation (T0). At the end, after the implementation of the recovery program, the average grade difference remained at -2.49. This means that, at the level of the entire sample of students and teachers who had remedial interventions,

the students' recoveries were quite small. For Intervention Group 1, which contains 56 students who were significantly behind by at least 2 grades compared to their current grade level, an average difference of -2.57 was recorded in the initial evaluation (T0). At the end, after the implementation of the recovery program, the average grade difference remained at -2.07. The Cohen's test indicates a small statistical difference in intensity. This means that during the 2023-2024 school year, the students who were included in the recovery programs and were evaluated initially and finally recovered on average about half a grade. From the subsample of 56 evaluated students, at the final evaluation: 23 progressed on average by 1.34 grades; 30 remained at the same level; 3 showed regression. The analysis of the evaluation results graphs indicates a dynamic trend on the right side at T1. Students who were 4 grades behind either recovered one grade or regressed. The most substantial recoveries are for students who were a maximum of 3 grades behind, especially those who were 1 or 2 grades behind. Thus, we can consider that in the case of very large gaps, the probability of recovery is small. Recoveries are easier when students are closer to the grade level they are enrolled in. Therefore, we can consider that Hypothesis 2 is partially validated. Students who followed literacy recovery programs with their teachers who were trained and mentored showed predominant growth where the gaps were a maximum of 3 grades. Of course, it should be mentioned that we did not consider in the analysis factors related to teacher characteristics: teaching experience, completed university, qualification, previous training programs. The results raised a new question that we will address in future research: "To what extent do teacher characteristics affect the results of students included in recovery programs?"

Figure 1

Situation of Students in Experimental Group 1 at T0
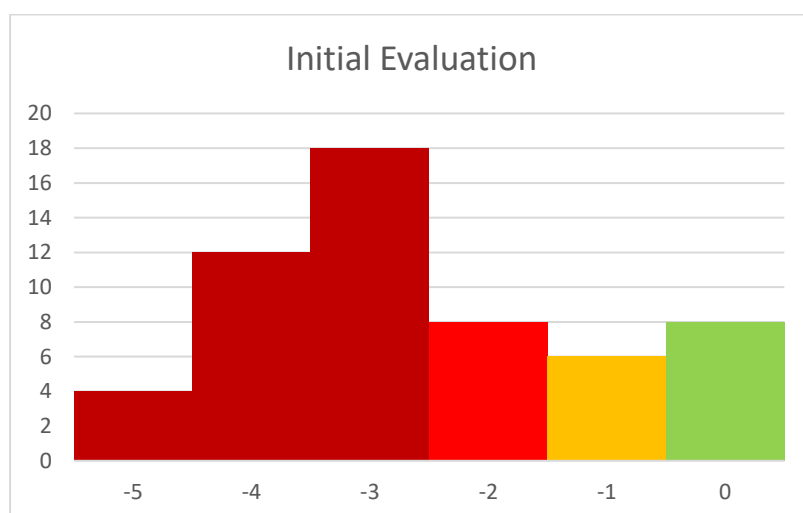
Figure 2
Situation of Students in Experimental Group 1 at T1
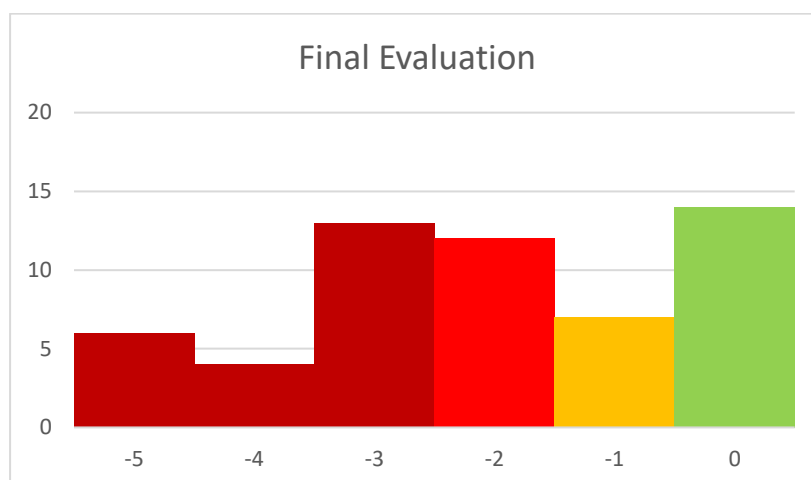
The group of students who worked with the literacy specialist was evaluated using the same instruments. The difference lies in the fact that we have an intervention led by a specialist, as well as a dedicated space for this intervention at the school level. For Experimental Group 2, the differences are on average less than -3 grades. This allowed for extensive testing with Instrument 2 (Informal Reading Inventory), which enabled measurements in two areas: reading accuracy and comprehension. For students in Experimental Group 2, the average difference (between the student's grade and the evaluated literacy level) in terms of reading accuracy was -3.4 at T0, and at T1 the difference was 1.1. The statistically significant difference is 2.3. This means that in terms of reading accuracy, students recovered on average more than 2 grades.

The average difference (between the student's grade and the evaluated literacy level) in terms of comprehension at the initial evaluation (T0) was 3.7, and at T1 the difference was 1.5. The statistically significant difference is 2.2. This means that in terms of comprehension, students recovered on average more than 2 grades.

Of the 17 students who participated in the recovery program and were initially evaluated, 6 moved past the emergent literacy stage, while 2 still need support in acquiring specific emergent literacy skills in certain areas, although they scored above 60%: 101 and 106 out of 150, respectively. From the group of 9 students evaluated initially and finally with the same instrument, the Informal Reading Inventory, the average score difference in terms of reading accuracy is 0.8 at T1, 2.8 points lower than at T0, where the average difference was 3.6. In terms of comprehension, for the same group of students, the average score difference decreased by 2.8 points. At T0, the average recorded difference was 4.4, and at T1, the indicator reached 1.6. This means that on average, students improved by approximately 3 grades in both comprehension and reading accuracy. The Cohen's test indicates a statistically significant difference of high intensity. Given these results, we can consider that Hypothesis 1 is validated. Students

who worked with a specialist in the pilot intervention program achieved better results at the end of the year, with significant improvements, some of them reaching grade-level competencies.

To test Hypothesis 3 in comparing the two groups, we used the Welch test, which indicates a statistically relevant difference between the two groups: Experimental Group 1 and Experimental Group 2, comparing the final evaluation results. It can be stated that students in Group 2, who worked with the specialist, achieved much better results than those who worked with classroom teachers. However, we remain cautious because the groups are different in terms of numbers, and the grade differences for Experimental Group 1 were much more pronounced.

Discussion and Conclusions

The results indicate that the interventions had a positive impact on students' literacy skills, but with significant variations between groups. For Experimental Group 1 (students who worked with their teachers), the recovery averaged about half a grade, suggesting a moderate impact of the training and mentoring programs for teachers. For Experimental Group 2 (students who worked with an external specialist), the improvements were significant, with an average recovery of more than 2 grades in terms of reading accuracy and comprehension. These results validate Hypothesis H1, which states that "Students with gaps in reading and writing skills who work with an external specialist will show significant and possibly greater improvements than students who work with the classroom teacher," as well as H3, which states that there are significant differences between the two groups. However, we would like to emphasize that these results should be treated with causion because, as it can be seen from the analysis, students who worked in recovery programs with classroom teachers had larger gaps than those who worked with the specialist. These gaps reach up to 5 grades, meaning that a fourth-grade child has emergent literacy skills. The results show that for these students, recovery is even more difficult; 2 of the students who were 4 grades behind at the initial evaluations regressed. Moreover, a significant portion of the sample, more than 50%, only maintained their level, without significant improvements. Improvements were predominantly for students who were 2 grades behind. This demonstrates the need for rapid intervention programs, starting from first grade, to prevent large gaps that are difficult to address, especially when they span an entire school cycle. Thus, we have a partial confirmation of Hypothesis 2: "The training and mentoring program offered to teachers will have a positive impact on the results of students selected for literacy recovery programs," with these improvements being sensitive to the size of the gap. Therefore, although the training and mentoring programs for teachers had a positive impact, the results suggest that interventions could be improved to increase their efficiency, especially for students with large gaps. There are aspects we did not consider, and we believe they could be the subject of more nuanced research regarding the characteristics of teachers that could positively or negatively influence the recovery

process of the students they work with. After establishing specialized university programs, which we recommend given the confirmation of Hypothesis 3, we could also include training providers as predictors in determining models that could improve students' literacy skills.

The presence of an external specialist demonstrated a significant impact on literacy recovery, suggesting that integrating such specialists in schools could be beneficial, with students recovering more than 2 grades. However, clear questions remain about who trains these specialists and what the costs of such programs extended at the national level are. We believe they could be treated as affirmative measures specifically aimed at students from vulnerable backgrounds. At the same time, we do not believe in a rigid approach that supports only one model, but we consider it necessary to integrate these recovery programs and approaches from the initial training of teachers, as well as part of continuous training, as part of horizontal career development in teaching. Moreover, beyond treatment itself, we are talking about prevention, and from this perspective, we consider that addressing this topic from the initial training of teachers would make them more attentive to the components of the reading and writing processes.

 Of course, there are certain limitations to the study, primarily due to the sample size: the small number of students in Group 2 may limit the generalization of the results. On the other hand, there are a series of uncontrolled factors, such as the individual characteristics of teachers and students, school characteristics,. the teaching experience of teachers, as well as other characteristics related to their training and continuous preparation; student motivation and the school climate in educational institutions were also not controlled in this study.

Beyond the results it offers on interventions aimed at children who need recovery programs for acquiring reading and writing skills, this study opens up broader research perspectives that could consider topics such as: teacher characteristics by investigating how teacher characteristics influence student outcomes; long-term interventions by studying the impact of interventions over a longer period to see if improvements are maintained; the organizational culture of the school by investigating how it can influence student outcomes, and a more detailed analysis of interventions by specifically evaluating the components of training and mentoring programs for teachers to identify the most effective practices.

In conclusion, the study demonstrated that interventions for recovering literacy skills are essential and can have a significant impact, especially when led by external specialists. However, to maximize the efficiency of these programs, an integrated approach is necessary, including both continuous teacher training and specialist support.

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Predictors of reading proficiency in Romanian 15-year-old students: findings from PISA 2018

Octavia BORȘ•

Abstract

This study investigates the predictors of reading proficiency among 15-year-old Romanian students using data from the PISA 2018 assessment. For many years, a significant proportion of students have not met the basic proficiency level in reading, as measured by PISA. Previous research indicates that family background is the strongest predictor of academic achievement among Romanian students; however, there is a lack of evidence regarding the contribution of specific teaching practices. Using multiple linear regression analysis, this study shows that when controlling for the social, economic, and cultural status of students, teacher-directed instruction negatively impacts reading proficiency. Furthermore, learning in a positive disciplinary climate, students' enjoyment of reading, and parental support also contribute to reading proficiency. The results underscore the need for more policies and interventions tailored to support students with low social, economic, and cultural status. Additionally, the study highlights the need for increased support for teachers to improve their practice by balancing direct instruction with more constructivist approaches.

Key words: reading literacy, PISA 2018, teacher-directed instruction, economic, social and cultural status, parental support, students' enjoyment of reading

Introduction

Adult literacy has a significant impact on health (DeWalt et al., 2004), occupational assignment (Boothby, 2002), earnings and employment (Lane & Conlon, 2016), and there is evidence that literacy explains partially the impact of schooling itself on earnings (Green & Riddell, 2002). Adult life can contribute to the development or losses of literacy proficiency (Wicht, Rammstedt & Lechner), but school has a significant and lasting effect; skills acquired by age 15 are at least partially maintained into young adulthood (Gustafsson, 2016, Strakova & Vesely, 2019). Furthermore, early literacy skills are important predictors for math skills

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• Universitatea din București, București, România, octavia.bors@gmail.com

(Purpura & Napoli, 2015, Peng et al., 2020), science skills (Morgan et al., 2024) and academic achievement of students with high socioeconomic risk (Herbers et al., 2012).

As shown by PISA, the reading skills of Romanian 15-years-old students are the lowest in Europe (OECD, 2023), 4 out of 10 students not reaching the minimal level of competence (Nausica Noveanu et al., 2023). PISA also shows that Romania has one of the highest worldwide students` performance gap (OECD, 2019b), which significantly increased after the COVID 19 pandemic (OECD, 2023). Students whose parents have lower educational levels and occupational statuses are more likely to not acquire basic reading skills (Nausica Noveanu et al., 2023), which influences their future learning and adult life. Therefore, understanding students` reading literacy performance is critical for future educational policy and practice.

In Romania, research has consistently demonstrated that students` learning outcomes are to an important extent predicted by their parent's education (Tufiş, 2008), socioeconomic status (Hatos, 2008), parents` occupational status and resources (Țoc, 2016), and the school of origin being located in a socioeconomically disadvantaged area (Gheba, 2021). Class-based educational inequalities have been attributed to pedagogical practices favouring middle- and high-class students (Borş, 2020). Additionally, there are other structural factors that contribute to persisting educational inequalities in Romania. In 2022, only 81% of 5-years-old Romanian children were enrolled in kindergarten (OECD, 2024a), which limits their early literacy skill development. Hungarian students learning in Romanian have lower academic performance than their peers (Hatos, 2011).

Little is known about the predictive power of students economic, social and cultural status on their literacy skills within the Romanian context when controlling for other school and individual factors. There is also a lack of evidence regarding which other factors—particularly teaching practices—have a strong relationship with students' reading literacy skills. This study aims to help fill these gaps in knowledge using PISA data.

In 2018, reading literacy was a major testing domain in PISA; therefore it includes domain-specific data on various factors that may predict students' performance, including reading-specific teaching practices. The purpose of this study is to identify what other factors—beyond economic, social, and cultural status—with a special interest in pedagogical practices—predict the reading achievement of Romanian 15-year-olds.

Reading skills explained

Previous analyses of PISA data show that the economic, social and cultural status has the largest effect on reading proficiency (Thorpe, 2007, Koyuncu and Firat, 2020). The gap of reading skills between students with low and high socioeconomic status sets in very early on, being powerfully associated with differences in acquiring letter-sound knowledge (Duncan & Seymour, 2010). The effect of socioeconomic status is significantly explained by

differences in phonological awareness and vocabulary knowledge between students (Li et al., 2023). Students with low socioeconomic status have poor reading prerequisites and also learn to read at a slower pace compared to their peers with high SES (Dolean et al., 2019).

Students from low socioeconomic backgrounds are more likely to spend less time reading, have less sleep, have higher rates of absenteeism, and have less parental encouragement, which have a negative impact on their literacy proficiency (Buckingham et al., 2013). Very early parental involvement, at ages three and four is associate with higher reading achievement (Reynolds et al., 2008), but students with low socioeconomic status also benefit later from their parents' involvement in literacy activities at home (Hemmerechts et al., 2016).

Early on, the disparities in reading achievement are strongly explained by socioeconomic inequalities but, as children grow, schools explain better the children's reading progress (Aikens & Barbarin, 2008). Socioeconomic inequalities in reading achievement are more likely in differentiated educational systems, with public or private selective schools (Le Donne, 2014). This partly due to schools' social composition, but is explained also by other school factors. 15-year-old students with low socio-economic status reach high proficient skills level in classrooms and schools with good disciplinary climate (Agasisti et al., 2018). Also, differentiated teaching, teacher support (Thorpe, 2007, Koyuncu and Firat, 2020), teachers` feedback (Koyuncu and Firat, 2020) and teachers' stimulation of reading engagement (Meng et al., 2016, Koyuncu and Firat, 2020) have positive effect on students` skills, when controlling for their social, economic and cultural status.

Finally, recent research has showed that there are also individual characteristics that foster reading achievement, such as passion for reading (Thorpe, 2007, Koyuncu and Firat, 2020), self-concept (Ma et al., 2021), intrinsic motivation to read (Froiland & Oros, 2014), strong effort and perseverance (Linnakyla et al., 2004). Teacher support, in particular, foster reader self-concept and academic enjoyment that have a positive influence on reading achievement (Jensen et al., 2018, Ma et al., 2021).

Data Source and Sample Characteristics: PISA 2018

The analysis is based on data from PISA 2018, a large-scale and standardized assessment of 15-year-olds competencies, run by the Institute of Educational Sciences[1], under the coordination of the Organization for Economic Cooperation and Development (OECD).

PISA aims to investigate the extent to which 15-year-old students have the knowledge and the skills that are necessary to fully participate in today`s social and economic life (OECD, 2019a). The study covers three assessment domains - science literacy, reading literacy and

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[1] Reorganized in the Education Research Unit within the National Center for Policy and Evaluation in Education in April 2020.

mathematical literacy-, and major domain, chosen from among the three, on a rotating basis. In 2018 the major assessment domain was **reading literacy**, defined as "*understanding, using, reflecting on and engaging with written texts, in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society*"[2] (OECD, 2010, p. 23).

In PISA, the students` skills are assessed using multiple-choice and open-end questions based on real-life situations. Plus, PISA collects data on students' background (learning experiences, demographic and home characteristics), school systems and teaching practices using questionaries administered to students, school principals and teachers (OECD, 2019a).

In Romania PISA 2018 data were collected from a statistically representative sample of 5,081 Romanian, 15-years-old students, from 170 schools, using a mixed multistage and stratified sampling procedure (OECD, 2009), with a validation rate of 99% (N = 5075 tests) (Novak et al., 2020). The sample includes students that are spread evenly across all regions of Romania, including 11 schools and 233 students (4.6%) that are learning in Hungarian.

In terms of urbanization, the sample is skewed in the favour of urban areas, 4285 sampled students (84%) belonging to urban schools. The underrepresentation of students from rural schools is justified taking in consideration that 96.9% of students come from high schools which in Romania are mainly located in cities. As mentioned, most study participants were enrolled in high schools (96.9%) fairly representing the theoretical (40%), technical (50%) and vocational (10%) track of study. The sample is also balanced in terms of gender, including 2444 girls (48.2%) and 2627 boys (51.8%) (Novak et al., 2020).

In 2018 the PISA results (skills assessment) were reported as 10 plausible values with a mean of 500 and a standard deviation of 100. Each of the 10 plausible values were statistically estimated based on the raw score, and represent the ability level at which a student is most likely to be in reality. The plausible values are generated using the Rasch model, which was designed to generate a symmetric continuum on which both item difficulty and student proficiency are represented and related by a logistic function. The most probably proficiency level is estimated based on this logistic model (OECD, 2019s, p.92). The results presented in this article are based on an analysis using the 10 plausible values, and the standard errors were computed by using 80 replicate weights, as advised by OECD.

Research objectives and data analysis

This study aims to develop an explanatory model for the reading performance of 15-year-old students from Romania. Specifically, it seeks to identify the factors that predict the reading skills of 15-year-old students, beyond their economic, social and cultural status, and with a focus on the influence of specific pedagogical practices. The data analysis included

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[2] The domain definition has changed in 2018 for countries that tested computer-assisted reading skills by adding 'assessment' to the other 4 general skills covered. (OECD, 2019a)

students` economic, social and cultural status, individual characteristics, pedagogical practices, and school characteristics.

The students` economic, social and cultural status (ESCS) was estimated based on parents' highest level of education, parents' highest occupational status and home possessions (eg.books in the home) as showed in table 1.

Table 1

The index of economic, social and cultural status

Economic, Social and Cultural Status (*ESCS*)	Highest level of parental education (*PARED)*
	● The level of education of the parent with the highest level of education expressed in the number of years spent in school.
	Highest Occupational Status (*HISEI)*
	● The occupational status of the parent with the highest occupational status calculated using the International Index of Socio-Economic and Occupational Status.
	Family possessions (HOMEPOS), index calculated based on students' answers regarding the availability of the following family goods and services:
	● TV, child's own room, mobile phone/smartphone, internet connection, cable/satellite TV;
	● Classical literature (e.g. Eminescu), poetry books, works of art, books about art, music or design;
	● Study table, a quiet place to study, a computer that can be used for school, educational software, useful books for study, technical reference books (technical dictionaries, scientific-technical journals, treaties), dictionary;
	● Number of TVs, cars, bathrooms, mobile phones with internet access, computers, tablets, e-book readers, musical instruments;
	● The number of books in the library.

The pedagogical practices included in the analysis were: adaptive instruction (adaptivity), teacher support (teachsup), teacher feedback (perfeed), teachers` stimulation of reading engagement (stimread) and teacher-directed instruction (dirins). The spread of these teaching practices was estimated by using 3 or 4 frequency/ opinion questions, contextualized to lessons of Romanian language and literature, addressed to students, according to table 2. For the purpose of this analysis, I have used the indices calculated by the PISA consortium using the Rasch model (OECD, 2009). The positive values of the indices indicate that the perceived frequency of practices is higher than the average frequency in OECD countries regarding that specific pedagogical practice.

Table 2
Pedagogical practices

Teaching practice	Items
Adaptive instruction (ADAPTIVITY)	• The teacher adapts the lesson to my class's needs and knowledge; • The teacher provides individual help when a student has difficulties understanding a topic or task; • The teacher changes the structure of the lesson on a topic that most students find difficult to understand.
Teacher support (TEACHSUP)	• The teacher shows an interest in every student's learning; • The teacher gives extra help when students need it; • The teacher helps students with their learning; • The teacher continues teaching until the students understand.
Teacher feedback (PERFEED)	• The teacher gives me feedback on my strengths in this subject; • The teacher tells me in which areas I can still improve; • The teacher tells me how I can improve my performance.
Teachers` stimulation of reading engagement (STIMREAD)	• The teacher encourages students to express their opinion about a text; • The teacher helps students relate the stories they read to their lives; • The teacher shows students how the information in texts builds on what they already know; • The teacher poses questions that motivate students to participate actively.
Directed instruction (DIRINS)	• The teacher sets clear goals for our learning; • The teacher asks questions to check whether we have understood what was taught; • At the beginning of a lesson, the teacher presents a short summary of the previous lesson; • The teacher tells us what we have to learn.

Other indices available in PISA 2018 and considered for the analysis are: parents' emotional support (emosups), learning goals (mastgoal), motivation to master tasks (workmast), value of school (attlnact), self-efficacy (resilience), fear of failure (gfofail), enjoyment of reading (joyread), disciplinary climate (disclima), sense of belonging to school (belong), students competition (percomp) and student cooperation (percoop). These indices were obtained by aggregating 3-5 items included in the context questionnaire for students (OECD 2020).

Although previous studies have shown that the shortage of educational materials at school level (Țoc, 2016) and the students' place of residence (Kryst et al., 2015) are important for explaining the performance of Romanian students, these variables were not

included in the analysis due to the large number of missing values. The descriptive analysis reported in Table 10, shows that 96% of the values are missing in the case of the index shortage of educational materials.

Also, PISA 2028 did not investigate the students' place of residence, but the location of the school through a question asked to the students in the background questionnaire. This is problematic because we know that in Romania there are students who live in rural areas, but study in urban areas. The reports published by the Ministry of Education do not provide information on this issue, which does not allow us to assess whether the data obtained in the PISA study are representative of the country's school population. At the same time, this item is problematic in terms of the scale use (1-rural locality (less than 3,000 inhabitants), 2-small town (between 3,000 and 15,000 inhabitants), 3-city (between 15,000 and 100,000 inhabitants), 4-large city (between 100,000 and 1,000,000 inhabitants), a very large 5-city (over 1,000,000 inhabitants) because in the case of Romania only 47% of rural localities have less than 3,000 inhabitants, their sizes varying up to ∼ 28,000 (INS, 2016).

In order to develop an explanatory model for students' reading performance, I opted for a multiple linear regression analysis (Rotariu et al., 2006, Popa, 2010, Gignac, 2019). I have used SPSS Statistics 25, improved with the Replicates package created by the Australian Council for Educational Research for the analysis of PISA data. The statistics related to the analyses were calculated following the correction of representativeness errors by weighting the data with the variable W_FSTUWT, recommended in the PISA manual (OECD, 2009). In calculating the standard error, SPSS assumes that the data used were collected by a simple, random sampling (equal chances of selecting the individuals in the sample), which means that in the case of PISA statistics (a mixed multistage sampling and stratification sampling procedure) will report underestimated values of standard errors. Thus, for a better approximation of standard errors and confidence intervals I used the Balanced Repeated Replication method with Fay modification (OECD, 2009). Descriptive and inferential statistics involving students' test scores were calculated as an average of the values obtained for each of the 10 plausible values (OECD, 2009).

Research results
The preliminary analysis shows that some of the independent variables initially considered have a negligible correlation with students' reading scores (Cohen, 1994). Namely, *adaptative instruction*, *teacher support* and *teacher feedback* have a correlation score under 0.1 with students` reading score. Also, individual and learning environment characteristics, such as *motivation to master goals*, *value of school, fear of failure*, respectively *sense of belonging to school* and *students' competition*, correlate negligibly with the reading score. Due to very low correlation, these variables were not considered for the multiple linear

regression analysis. The results of the descriptive and correlation analysis can be found in Table 10 and 11, Annex 1.

The descriptive analysis and correlation analysis showed that *the economic, social and cultural status* of students strongly correlates with their score in reading. Out of the pedagogical practices investigated in PISA 2018, only *teacher-directed instruction* and *teachers` stimulation of reading engagement* correlate significantly with the students` reading score. Other variables that significantly correlate with the reading score and were included in the analysis are: *parents' emotional support, enjoyment of reading, motivation to master tasks, self-efficacy, disciplinary climate, student cooperation*. Therefore, these variables were considered for the multiple linear regression analysis. The results of the descriptive and correlation analysis can be found in Table 5 and 6.

The descriptive analysis of the data shows that almost half of Romanian students (41%) scored below level 2 in reading, which means that they cannot locate and infer certain information from incomplete texts, where information is presented implicitly (OECD, 2019a). Romanian students obtained an average score of 428 (M=427.7, SE=5.19, SD=98.38, SE=2.21), lower than 487, the OECD average (OECD, 2019b). The Romanian students' scores are normally distributed around the mean, being only slightly flattened (Bolt= -.23) and skewed to the left (Obliquity= -.16).

The average score obtained by Romanian students corresponds to the minimum level of proficiency in reading literacy (2). The distribution of scores on proficiency levels shows that about 7 out of 10 Romanian students have low and minimal reading proficiency (≤ level 2) and 3 out of 10 have medium reading proficiency. Only about 1 Romanian student out of 100 has high reading proficiency (≥ level 5), compared to the OECD average (2019b) where ~9 pupils out of 100 score at this level. In interpreting the graph, one should bear in mind that, according to PISA assessment framework (OECD, 2019b), 2 is the minimum proficiency level at which 15-year-old students should be, 3 and 4 are average levels, and 5 and 6 are high proficiency levels. Thus, it can be seen that although normally distributed, in terms of performance, Romanian students' scores are concentrated at the minimum level (2) or below.

Figure 1

Romanian students' distribution on reading proficiency levels

Reading proficiency levels, PISA 2018
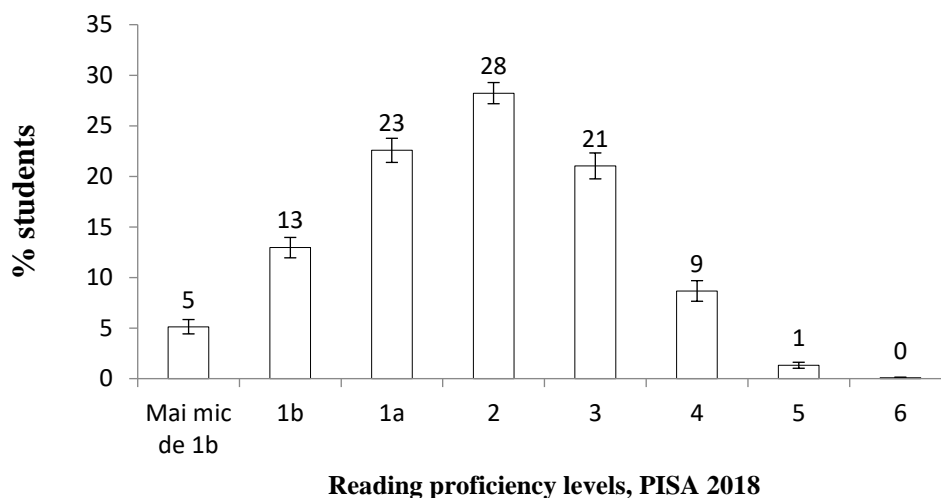
* Standard errors and confidence intervals can be found in Table 8, Annex 1.

Table 3

Average reading score by economic, social and cultural status (ESCS) of students

ESCS	Average reading score	Standard error
Very low status/ Quartile 1	376	5.12
Low status/ Quartile 2	417	4.68
High status/ Quartile 3	436	4.67
Very high status/ Quartile 4	484	5.63

N=147547

The distribution of the average reading score by the economic, social and cultural status (ESCS) of students shows that the percentage of low achievers is higher for low ESCS and increases with ESCS. On average, in OECD countries only 2.9% of very low ESCS students compared to 17.4% of very high ESCS students are highest achievers, scoring at level 6 of reading proficiency (OECD, 2019b). In Romania, less than 1% of very low ESCS students score at level 5 or 6 compared to ~4% of very high ESCS students. On the other side, 19% of students with very high ESCS score below the minimum proficiency level compared to 61% of those with very low ESCS.

Data shows that there is a positive and moderate (Cohen, 1994) correlation between the Romanian students' reading literacy scores and their economic, social and cultural status (r=.43, SE=0.02, p<0.01). As previous studies (Țoc, 2016), PISA 2018 shows that students

with high economic, social and cultural status systematically achieve higher reading scores than students with lower status.

Table 4

% of students by economic, social and cultural status and proficiency reading level

	< 1b	1b	1a	2	3	4	5	6
Very low status	11%	21%	29%	25%	11%	2%	0	0
Low status	5%	15%	25%	30%	19%	6%	1%	0
High status	3%	11%	22%	30%	23%	9%	1%	0
Very high status	1%	4%	14%	28%	31%	19%	4%	0

N=147547,

Standard errors and confidence intervals can be found in Table 9, Appendix 1.

Also, there are statistically significant correlation, of low intensity, between Romanian students' reading literacy scores and the frequency of different pedagogical practices. According to the analysis, a higher frequency of teacher-directed instruction is slightly correlated with lower reading scores (r=-.14, r2=1.9%, p<0.01). On the other hand, more frequent teachers` stimulation of reading engagement is slightly correlated to higher reading literacy scores (r=.12, r2=1.3%, p<0.01).

Also, as it can be seen in the bivariate correlation matrix (Table 6) parents' emotional support, enjoyment of reading sand disciplinary climate is positively to moderately correlated with Romanian students' reading scores. Last but not least, the score is positively correlated with students` motivation to master tasks, self-efficacy and cooperation, but the value of the correlation coefficient is small.

The results of the preliminary analyses show that for the variables under consideration, the conditions for performing multiple linear regression analysis are met:

- the variables (indices) included in the analysis are continuous;
- the indices have a normal distribution, the skewness and kurtosis indicators have values between -1 and 1 with one exception, parents' emotional support, which has a distribution slightly right-skewed and slightly flatter;
- the percentage of missing values is below 4%, with the exception of students` cooperation (13%) and parents` emotional support (10%);
- none of the variables have values lower by 3 interquartile deviations from the first quartile and higher by 3 interquartile deviations from the third quartile, respectively, according to boxplot plots and SPSS demarcations, a sufficient condition according to Gignac (2019);
- there is no multicollinearity among the introduced independent variables, as can be seen in Appendix 1, the tolerance index has values greater than 0.1, and the VIF index has values less than 10 (see Table 12).

Table 5

Descriptive analysis

	N (Missing Values)	Minimum Maximum	Average (Standard Error)	Standard deviation (Standard Error)	Skeweness (Standard Error)	Kurtosis (Standard Error)
Reading score (PVREAD)	148097 (0)	93.48 742.51	427.7 (5.19)	98.38 (2.21)	-0.16 (0.06)	-0.23 (0.11)
Economic, social and cultural status (ESCS)	147547 (550)	-4.22 2.85	-0.47 (0.05)	0.97 (0.02)	-0.03 (0.07)	-0.07 (0.13)
Teachers` stimulation of reading engagement (STIMREAD)	145109 (2953)	-2.3 2.09	0.293 (0.02)	1 (0.01)	-0.05 (0.03)	-0.15 (0.05)
Teacher-directed instruction (DIRINS)	145490 (2608)	-2.94 1.82	0.321 (0.03)	0.97 (0.02)	-0.21 (0.06)	0.09 (0.11)
Parents' emotional support (EMOSUPS)	134440 (13658)	-2.45 1.03	0 (0.02)	0.95 (0.01)	-0.36 (0.04)	-1.05 (0.04)
Motivation to master tasks (WORKMAST)	142380 (5718)	-2.74 1.82	-0.01 (0.02)	0.92 (0.01)	0.18 (0.03)	-0.25 (0.06)
Self-efficacy (RESILIENCE)	143087 (5011)	-3.17 2.37	0.14 (0.02)	0.93 (0.01)	0.39 (0.05)	0.62 (0.12)
Enjoyment of reading (JOYREAD)	145197 (2901)	-2.71 2.61	0.1 (0.03)	0.96 (0.01)	0.28 (0.04)	0.61 (0.09)
Disciplinary climate (DISCLIMA)	144918 (3180)	-2.71 2.03	0.38 (0.03)	1.03 (0.02)	-0.41 (0.04)	0.23 (0.07)
Student cooperation (PERCOOP)	129227 (18871)	-2.14 1.68	0.1 (0.02)	0.96 (0.01)	-0.31 (0.03)	-0.61 (0.04)

Table 6
Bivariate correlation matrix

		1	2	3	4	5	6	7	8	9	10
1. Reading score	r	1									
	N	148098									
2. Teachers` stimulation of reading engagement	r	.12	1								
	N	145145	145145								
3. Teacher-directed instruction	r	-.14	.37	1							
	N	145490	144346	144346							
4. Economic, social and cultural status	r	.42	.11	-.08	1						
	N	145026	144859	145204	147547						
5. Parents' emotional support	r	.27	.23	.06	.2	1					
	N	134440	133059	133521	134127	134440					
6. Motivation to master tasks	r	.13	.24	.14	.09	.33	1				
	N	142379	141066	141458	142062	132211	142380				
7. Self-efficacy	r	.15	.22	.14	.17	.37	.47	1			
	N	143087	141691	141970	142766	133301	140989	143087			
8. Enjoyment of reading	r	.27	.15	.05	.15	.19	.2	.09	1		
	N	145197	143957	144329	144911	133406	141467	142103	145197		
9. Disciplinary climate	r	.24	.24	.13	.14	.17	.13	.09	.17	1	
	N	144918	143684	144213	144632	132947	140875	141333	143627	144918	
10. Student cooperation	r	.16	.27	.18	.11	.33	.25	.27	.14	.23	1
	N	129227	127883	128213	128880	127956	127059	128067	128232	127726	129227

In order to obtain a final regression model, it was necessary to repeat the analysis twice using the non-selective or standard method (enter). As a first step, I introduced in the analysis the students' reading score as a dependent variable and the economic, social and cultural status, teacher-directed instruction, teachers` stimulation of reading engagement, parents` emotional support, enjoyment of reading, motivation to master tasks, self-efficacy, students` cooperation and disciplinary climate as independent variables. This first model obtained showed that the effect of students` self-efficacy, motivation to master tasks and cooperation, and teachers` stimulation of reading engagement is not statistically significant (see Table 7).

By removing the independent variables with a statistically insignificant effect, I obtained a second and final regression model. The final regression model, with 5 independent variables, explains 28% of reading score variation. According to this model, the index of students' economic, social and cultural status has the highest effect on the reading score. More precisely, after controlling for other variables, an increase of one standard deviation of ESCS index corresponds to an increase of about 33 standard deviations in the reading score.

Of the pedagogical practices, only teacher-directed instruction was found to have a statistically significant effect on students` reading literacy score. Specifically, an increase of one standard deviation of the index of teacher directed instruction corresponds to a decrease of about 15 standard deviations in the reading score. Also, the final regression model shows that the effect of this pedagogical practice is smaller than the effect of students' economic, social and cultural status. The difference between the effect of students' economic, social and cultural status and the effect of teacher-directed instruction is statistically significant with 95% probability because there is no overlap between the confidence intervals (95%) of the standardized effects (Cummings, 2009 in Gignac, 2019).

As for the other variables, students` enjoyment of reading, parents` emotional support and the disciplinary climate, they have a positive effect, significantly lower than that of economic, social and cultural status. Also, the final model shows that the effect of teacher-directed instruction is smaller than the effect of students` enjoyment of reading and has a similar value to the effect of parents` emotional support and disciplinary climate. However, the effect of these variables is positive and the difference between them is not statistically significant, as there is more than 50% overlap between the confidence intervals, which means that the difference is not statistically significant with 95% probability.

Table 7

Regression model 1 and 2

	Model 1				Model 2			
	Standardized Coefficients	Standard Error	Confidence Interval (95%)		Stand. Coef.	Standard Error	Confidence Interval (95%)	
Constant	446.50	3.34	439.95	453.05	445.49	3.44	438.74	452.24
Economic, social and cultural status	31.22	1.99	27.32	35.13	32.69	2.17	28.43	36.95
Enjoyment of reading	17.08	1.48	14.17	19.98	17.48	1.46	14.62	20.34
Teacher-directed instruction	-15.45	2.10	-19.57	-11.32	-14.90	1.77	-18.36	-11.44
Disciplinary climate	13.41	1.75	9.97	16.84	14.20	1.73	10.81	17.60
Parents` emotional support	13.05	1.96	9.21	16.88	14.98	1.86	11.33	18.63
Students` cooperation	2.77*	1.72	-0.60	6.14				
Teachers` stimulation of reading engagement	2.87*	1.91	-0.88	6.62				
Motivation to master tasks	-1.08*	2.05	-5.09	2.94				
Self-efficacy	1.80*	1.85	-1.82	5.42				
R-squared	0.27	0.02			0.28	0.02		

* The value 0 is within the confidence interval, so the effect size is not statistically significantly greater than 0 (OECD, 2009).

Conclusions and discussion

Through this secondary analysis of PISA 2018 data, I set out to investigate whether specific pedagogical practices (adaptive instruction, teacher support, teacher feedback, teachers` stimulation of reading engagement, and teacher-directed instruction) are explanatory variables for the reading scores of 15-year-old Romanians when controlling for their economic, social and cultural status.

Preliminary analysis and multiple linear regression analysis showed that, out the pedagogical practices measured in PISA 2018, only teacher-directed instruction has a statistically significant negative effect on Romanian students' reading scores. Three out of the five pedagogical practices considered (adaptive instruction, teacher support, teacher feedback) are positively but negligibly ($r<.1$) correlated with students' reading scores and therefore were not included in the multiple regression analysis. Teachers` stimulation of reading engagement is a practice that is positively correlated with the reading scores, albeit at a low level. However, the first regression model, after controlling for other variables, showed that teachers` stimulation of reading engagement has no statistically significant effect on reading scores.

The final regression model obtained shows that the economic, social and cultural status of students is the variable with the largest effect on the Romanian students' reading score. The effect of teacher-directed instruction is smaller and comparable to the effect of enjoyment of reading, disciplinary climate and parental emotional support. More specifically, an increase of one standard deviation in the index of teacher-directed instruction is associated with a decrease of about 15 standard deviations in the reading score.

The strong relationship between the reading scores of 15-year-old Romanians and their economic, social and cultural status confirms previous studies (Tufiş, 2008, Ţoc, 2016, Ivan, 2019). This result is also consistent with international studies showing that the explanatory power of pedagogical practices is low (Scheerens, 2016), while the explanatory power of economic, social and cultural status remains high (Sirin, 2005). The negative effect of teacher-directed instruction contradicts indicating that directed instruction positively contributes to school achievement (McMullen and Madelaine, 2014). A possible explanation could be that in Romania, this practice is insufficiently balanced by constructivist pedagogical practices, which recent studies suggest would lead to better school outcomes (Hattie and Timperley, 2007, Robertson et al., 2016).

The study`s results show that ensuring equity in education remains an important challenge for Romania. Illiteracy, understood as the ability to read and write, has declined in recent years, but it was not yet eradicated in Romania (Buza, 2022). From a performance perspective, inequity is reflected in the high share of low performing students, the persistent gap among students from different family backgrounds (Ciolan et al., 2021) or from urban and rural areas (Buza & Tuşa, 2024, Ţoc et al., 2024). Before the pandemic, in 2019, 23% of

8th grade students and ~20% of the 12 grade students scored lower than the minimum level of competence at the national evaluation and baccalaureate (Ministerul Educației și Cercetării, 2019). PISA 2022 shows that in Romania, low reading scores are more likely to be obtained by students with low ESCS, and the strength of the relationship between reading performance and students` socio-economic status is above the OECD average, placing Romania among the most inequitable countries (OECD, 2023).

Although in many countries education doesn`t overcome social inequalities, their relationship between these inequalities and student academic performance has evolved over time and differs across various social, political, cultural, and economic contexts (Gustafsson, Nilsen și Hansen, 2016, Santibanez și Fagioli, 2016). To improve equity and students' achievements is necessary to enhance collaboration between researchers and policymakers (Iftimescu & et al., 2020), between researchers and teachers (Ion et al., 2017), the induction policies and practices of newly qualified teachers (Stîngu, 2020), and to encourage reflective practices (Miulescu & Tacea, 2023). More specifically, it is important to remember that 15-year-old students with low socio-economic status can achieve high proficiency levels in classrooms and schools with a good disciplinary climate, a high number of extracurricular activities, and low teacher turnover (Agasisti et al., 2018).

In Romania, educational policies are dominated by neo-liberal understandings, initially driven by World Bank (Solonean, 2023) and more recently by OECD (OECD, 2024b). The pandemic stirred up discussions about the inequity of education in Romania, but the state`s immediate response did not include transformative policies for greater equity (Mitescu-Manea et al., 2021). This came later with new policies and programs targeting educational inequalities and teacher training (Comisia Europeană, 2024), the effects of which are to be seen in the coming years.

Annex 1

Table 8

% of Romanian students by proficiency reading levels

Proficiency reading level	Percentage	Standard Error	Lower limit	Upper limit
Smaller than 1b	5.13	0.71	3.71	6.55
1b	12.95	1.01	10.94	14.97
1a	22.57	1.19	20.19	24.96
2	28.23	1.05	26.13	30.32
3	21.03	1.28	18.47	23.59
4	8.67	1.02	6.64	10.70
5	1.32	0.30	0.73	1.91
6	0.09	0.05	-0.01	0.20

N=148098

Table 9

% of students by proficiency reading level and economic, social and cultural status (ESCS)

		Smaller than 1b	1b	1a	2.00	3.00	4.00	5.00	6.00
Very low ESCS	Percentage	11.24	21.45	29.11	25.10	11.33	1.70	0.07	
	Standard Error	1.87	1.73	1.77	1.75	1.39	0.49	0.11	
	Confidence Interval (95%)	7.49 14.98	17.99 24.92	25.57 32.65	21.60 28.59	8.54 14.12	0.73 2.67	-0.14 0.29	
Low ESCS	Percentage	4.52	15.30	25.01	30.04	18.57	5.84	0.72	0.01
	Standard Error	0.97	1.64	1.64	1.79	1.80	0.88	0.42	0.04
	Confidence Interval (95%)	2.57 6.47	12.01 18.59	21.73 28.28	26.47 33.61	14.96 22.18	4.08 7.60	-0.13 1.56	-0.07 0.09
High ESCS	Percentage	3.46	10.57	22.50	30.49	23.49	8.62	0.82	0.04
	Standard Error	0.73	1.28	1.45	1.67	1.69	1.40	0.32	0.08
	Confidence Interval (95%)	2.00 4.92	8.02 13.12	19.60 25.40	27.15 33.84	20.11 26.86	5.83 11.42	0.18 1.47	-0.13 0.21
Very high ESCS	Percentage	0.77	4.36	13.94	27.60	30.82	18.53	3.66	0.32
	Standard Error	0.34	0.81	1.62	2.02	1.90	1.91	0.74	0.20
	Confidence Interval (95%)	0.09 1.46	2.73 5.98	10.70 17.18	23.55 31.64	27.02 34.63	14.72 22.34	2.17 5.15	-0.08 0.73

N=147547

Table 10

Descriptive analysis

	N (Valori lipsă)	Minim Maxim	Media (Eroarea Standard)	Abaterea Standard (Eroarea Standard)	Oblicitate (Eroarea Standard)	Boltire (Eroarea Standard)
Adaptive instruction (ADAPTIVITY)	144484	-2.26	0.041	0.98	0.03	0.13
	3614	2.01	0.02	0.01	0.03	0.05
Teacher support (TECHSUP)	145875	-2.71	0.22	0.97	-0.67	-0.02
	2735	1.31	0.02	0.02	0.03	0.08
Teacher feedback (PERFEED)	145361	-1.63	0	0.92	0.19	-0.47
	4836	2.02	0.02	0.01	0.03	0.03
Students' competition (PERCOMP)	133299	-1.9892	0.13	0.92	-0.07	-0.2
	14799	2.0378	0.02	0.01	0.03	0.04
Motivation to master tasks (MASTGOAL)	142815	-2.53	0.1	1.01	-0.12	-0.15
	5283	1.85	0.02	0.01	0.03	0.05
Value of school (ATTLNACT)	142538	-2.54	0	0.92	-0.35	-0.78
	5560	1.08	0.02	0.01	0.03	0.06
Fear of failure (GFOFAIL)	142946	-1.89	-0.27	0.89	0.19	-0.02
	5151	1.89	0.01	0.01	0.02	0.05
Sense of belonging to school (BELONG)	143008	-3.2367	-0.03	0.94	1.03	1.86
	5090	2.7849	0.02	0.02	0.05	0.13
Shortage of school materials (EDUSHORT)	5793	-1.42	0.36	0.9	-0.022	0.093
	142304	2.96	0.08	0.05	0.18852	0.29192
School locality (SC001Q01TA)	5699	0				
	142399	1				

Table 11

Bivariate correlation matrix

		Reading score	Adaptive instruction	Teacher support	Teacher feedback	Motivation to master tasks	Value of school	Fear of failure	Sense of belonging to school	Students competition
1.Reading score	r	1								
	N	148098								
2.Adaptive instruction	r	.06	1							
	N	144484	144484							
3.Teacher support	r	-.05	.41	1						
	N	145363	143975	145363						
4.Teacher feedback	r	-.03	.48	.39	1					
	N	143262	141914	142553	143262					
5. Motivation to master tasks	r	.08	.16	.18	.21	1				
	N	142815	140947	141677	139854	142815				
6. Value of school	r	.04	.1	.15	.13	.41	1			
	N	142538	140573	141359	139292	140271	142538			
7.Fear of failure	r	.02	-.01	-.07	-.01	.07	.02	1		
	N	142946	141184	141865	139872	141504	140438	142946		
8. Sense of belonging to school	r	.08	.16	.14	.16	.2	.21	-.17	1	
	N	143008	140961	141746	139789	141788	140059	141317	143008	
9. Students competition	r	.07	.1	.08	.16	.19	.11	.08	.13	1
	N	127567	131642	132201	130613	131964	130754	131825	132208	127567

Table 12

Tolerance index and VIF

Independent variables	Tolerance	VIF
Economic, social şi cultural status (ESCS)	0.909	1.100
Teachers` stimulation of reading engagement (STIMREAD)	0.757	1.321
Teacher-directed instruction (DIRINS)	0.824	1.214
Enjoyment of reading (JOYREAD)	0.910	1.098
Motivation to master tasks (WORKMAST)	0.708	1.412
Self-efficacy (RESILIENCE)	0.692	1.446
Parents' emotional support (EMOSUPS)	0.763	1.311
Disciplinary climate (DISCLIMA)	0.889	1.125
Students cooperation (PERCOOP)	0.816	1.226

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Literacy as a Social Practice: Exploring Teacher Representations

Elena UNGUREANU •

Abstract

This study explores how literacy is conceptualized by teachers in two primary classrooms, drawing upon James Paul Gee's theoretical framework on literacy as a social practice. The research is guided by two questions: How do teachers conceptualize literacy within the context of their classrooms? How do contextual characteristics position students' identities as literacy learners/users? Through thematic analysis of semi-structured interviews, three predominant themes were developed: a narrow focus of literacy, deficit-oriented framing of student abilities, and teacher-centered pedagogy. The findings reveal that teachers often emphasize foundational writing skills and view literacy through a lens of deficiency, which shapes students' identities as passive learners. This research underscores the need for inclusive and equitable literacy education that acknowledges diverse backgrounds and experiences, advocating for pedagogical shifts that empower students as active participants in their literacy development.

Keywords: Literacy, Social Practice, James Paul Gee, primary education, pedagogic practices, qualitative research

Introduction

In recent decades, research on literacy has shift from views of reading and writing as isolated technical skills to recognizing literacy as a complex social practice. This perspective, grounded in sociocultural theories, emphasizes that literacy is shaped by cultural, institutional, and power dynamics. Literacy practices are now understood as deeply embedded in social contexts, where discourses of power and identity shape how individuals engage with reading and writing (Gee, 1989, 2011; Barton & Hamilton, 2000; Poulson et al., 2001).

• Dr. University of Bucharest, elena.ungureanu@fpse.unibuc.ro

While literacy is increasingly understood as a social practice shaped by cultural, institutional, and power dynamics, there remains a gap in understanding how teachers' conceptualizations of literacy are related to students' identities as literacy learners and users. This gap is especially significant for students from marginalized backgrounds, where mismatches between home-based and school-based literacy practices can reinforce systemic inequities. To address this, the study in this article makes an initial step by describing teachers' representations and understandings of literacy as a social practice.

This paper explores how literacy is constructed by teachers in two primary classrooms, applying James Paul Gee's framework of literacy as a social and cultural practice. Gee's concept of "Discourses" (Gee, 1989, 2012) serves as a lens to analyze how teachers describe the literacy context in their classrooms, thereby shaping student identities as learners. Through thematic analysis of interviews, this study describes teachers' literacy practices to enhance our understanding of the socially accepted ways of using language in school contexts represented by the participants in the study. Ultimately, the study aims to contribute to ongoing discussions about the need for more equitable and inclusive literacy education.

1. Literacy as a Social Practice

The understanding of literacy has shifted from viewing it as a purely cognitive skill to recognizing it as a social practice, deeply influenced by cultural and institutional contexts. Barton and Hamilton (1998) emphasize that literacy is not just about the mechanics of reading and writing; it also encompasses the social relationships, values, and ideologies that inform how literacy is practiced and understood. This perspective invites educators and researchers to look beyond the technical aspects of literacy and consider the broader social factors that shape how individuals engage with consuming and producing texts (Gee, 2015) and construct meaning.

From this viewpoint, literacy is relational, embedded in the everyday social practices of individuals and communities. Barton and Hamilton (1998) argue that literacy practices are context-dependent, varying across different cultural, economic, and institutional environments. For example, the literacy practices of students at home may differ significantly from those expected in formal educational settings. This disconnect can result in a mismatch between students' home-based literacies and the literacies valued in schools, often privileging dominant cultural narratives and marginalizing students from diverse linguistic and cultural backgrounds (Cairney & Ruge, 1998).

One of the central concerns of this approach is the role of power in shaping what counts as legitimate literacy practices. Gee (1989) builds on this by introducing the concept of "Discourses," which refers to socially accepted ways of using language, thinking, and acting that reflect specific social and cultural identities. He distinguishes between "primary Discourses," which individuals acquire through early socialization in their homes and communities, and "secondary Discourses," which are learned in

institutions like schools. This distinction highlights the potential for conflict when students' primary Discourses do not align with the secondary Discourses they encounter in educational contexts. These tensions can impact students' identity formation and their ability to navigate different literacy practices effectively.

Gee's framework also introduces the concept of "literacy events" and "literacy practices," which help to illustrate how literacy is enacted in specific contexts. A "literacy event" refers to any occasion where written language is integral to the interaction, while "literacy practices" are the broader social and cultural norms that shape how individuals engage in these events (Gee, 1987). This distinction allows for a more nuanced analysis of how literacy is situated within everyday life and how power relations within a given context can influence access to literacy. For instance, in classroom settings, teachers' definitions of literacy and the pedagogical approaches they use can either reproduce or challenge existing power dynamics, shaping who gets to participate in literacy practices and how.

Digital literacy adds another layer of complexity to the discussion. As Kumpulainen and Gillen (2017) point out, children's engagement with digital literacy at home is often overlooked in traditional literacy instruction. Digital literacies, which involve navigating multimedia and interactive platforms, are an integral part of many students' everyday lives, yet they are rarely incorporated into classroom instruction in meaningful ways. This oversight contributes to the ongoing disconnect between home and school literacies, particularly for students from socio-economically disadvantaged backgrounds, where digital engagement may be mediated differently.

The role of families in shaping children's literacy practices is also crucial. Research shows that parents mediate their children's digital literacy experiences in various ways, such as through "co-use" (participating in activities together), "active mediation" (providing guidance), or "restrictive mediation" (setting limits) (Kumpulainen & Gillen, 2017, Kumpulainen et al., 2020). These strategies are influenced by the parents' own educational backgrounds and digital proficiency, which can further widen the gap between home and school literacy practices. Understanding the interplay between these home-based practices and school expectations is vital for creating inclusive literacy environments that bridge these divides.

By viewing literacy as a social practice, educators are encouraged to consider how their instructional methods might either support or marginalize certain students. Pedagogical decisions are not neutral; they reflect broader societal ideologies and can either perpetuate or disrupt systemic inequities (Hattan & Lupo, 2020). For students from diverse backgrounds, recognizing and incorporating their home-based literacy practices into the classroom can create more inclusive learning environments (Kumpulainen & Gillen, 2017). When literacy instruction fails to account for these diverse practices, it risks alienating students whose experiences and identities do not align with the dominant literacy norms (Cairney & Ruge, 1998; Rogers, 2002, Rogers & Schaenen, 2014)).

While literacy is defined as a competence, it can still be framed as something to be taught or learned. Competences are indeed developed through structured processes, but this development inherently involves elements of learning, teaching, and content. The use of literacy as a competence does not exclude these terms or their relevance within pedagogical discourse. As Gee (1989, 2010) argues, literacy is not a neutral or standalone skill but is deeply embedded in social, cultural, and disciplinary practices. It involves participating in specific "Discourses," which are integrated ways of saying, doing, being, valuing, and believing.

According to the romanian national curriculum, competences are defined as structured ensembles of knowledge, skills, and attitudes developed through learning, which allow for solving specific problems within a field or general problems in various particular contexts. This aligns with the sociocultural perspective that literacy practices are not decontextualized skills but are situated in specific social and cultural contexts where texts, language, and actions are intertwined (Draper et al., 2005; Gee, 1987). Draper et al. (2005) further emphasize that separating literacy from content is detrimental, as literacy acts and content knowledge are interdependent; meaningful literacy activities require an understanding of the concepts they aim to communicate. This reinforces the idea that literacy instruction must be contextualized within the content area.

From the teacher's perspective, as long as the significance of knowledge is not overemphasized (e.g., equating competences solely with knowledge), the formation of competences cannot be reduced to the mere transmission of knowledge. Teaching literacy involves apprenticing students into discipline-specific practices, where they learn to navigate the norms, conventions, and values of particular fields, as Gee (2010) highlights through his concept of "apprenticeship in social practices." Similarly, while content is not the sole aim of the teaching-learning process, it remains a crucial element, as literacy practices cannot exist independently of the content that gives them meaning. As Draper et al. (2005) assert, "there is no such thing as a general ability to read and write; there is only the ability to read and write something" (p. 14).

We acknowledge the importance of emphasizing literacy as a competence and will revise specific phrasing to align with this perspective, ensuring clarity and consistency with contemporary educational discourse. At the same time, we aim to maintain a pedagogical approach that recognizes the interdependence of teaching, learning, and content, as these elements play a foundational role in developing literacy as a dynamic and multidimensional competence. As Gee (1989) and Draper et al. (2005) argue, literacy involves not only technical skills but also the ability to engage with and contribute to the social practices and Discourses of a community, making the integration of teaching, content, and social context indispensable.

This study, grounded in Gee's (1989) theoretical insights regarding discourse and literacy practices, seeks to examine how teachers in two primary classrooms talk about literacy as a social practice, so that, in Gee's terms (2015) we have a glimpse on the

favoured ways of using texts and language. While literacy is increasingly understood as a social practice shaped by cultural, institutional, and power dynamics, there remains a gap in understanding how teachers' conceptualizations of literacy impact students' identities as literacy learners. This gap is especially significant for students from marginalized backgrounds, where mismatches between home-based and school-based literacy practices can reinforce systemic inequities. By analyzing how educators mediate literacy through classroom discourse, this research aims to bring more understanding on how students' identities as literacy learners are shaped by these practices. The study further explores the implications of these findings for developing more inclusive and equitable literacy education, emphasizing the importance of recognizing and valuing diverse literacy practices in schools. To address this, the study examines how teachers in two primary classrooms conceptualize literacy within their specific contexts and how these contextual characteristics influence students' identities as literacy learners.The research questions that guided my analysis are:

- How do teachers conceptualize literacy within the context of their classrooms?
- How do contextual characteristics position students' identities as literacy learners?

2. Metodology

2.1. Research Design

For the study presented here I used a qualitative research design, that is being part of a broader ethnographic research conducted for my doctoral dissertation, between 2018-2019. Data for this article were collected based on longitudinal semi-structured and non-structured interviews with two primary school teachers over two academic years. The data thus obtained were analyzed thematically (Braun & Clarke, 2006), in light of a constructivist approach. The design allowed me to document and understand litearcy practices, and the representations of students as learners and users of literacy practices. The audio recordings were made using a mobile phone, and all identifying details regarding the schools and their locations will remain confidential, with data being anonymized in the reporting of the research results.

2.2.Generation of the data

Throughout the 2017/2018 school year, semi-structured and unstructured interviews were conducted with teachers from the classes under study. An interview guide was developed, with each interview typically starting from 1-3 prepared questions and evolving based on observed classroom elements. A total of 31 interviews were conducted, each lasting between 10 and 45 minutes. Notably, on days when classroom observations were made, multiple interview sessions were held depending on the teachers' availability. The interviews were generally carried out during free periods, when students were engaged in other subjects with different teachers, such as religion, physical

education, or modern languages. Additionally, discussions sometimes took place during breaks or after the school day. It is important to note that the interviews were conducted with only two teachers participating in the study, and these sessions were carried out longitudinally. The semi-structured longitudinal format allowed for detailed insights related to the studied contexts—specifically the two classes of students—and fostered the development of the research relationship with the participants. Throughout the interview process, repeated engagement with specific themes allowed for greater saturation of the data obtained. On several occasions, aspects that could not be addressed in one session were revisited in subsequent interviews. Additionally, these interactions enabled clarification of certain characteristics of the activities observed in class, allowing for a more in-depth analysis. For instance, in my field notes on October 12, 2018, I recorded: "08:20: The children are not having physical education today; they had a math class. Why math? In the brief conversation with Gabriela (not her real name), she mentioned they are counting up to 100 and finding it difficult. She noted that next week, likely on Thursday, they will have a test and are preparing for it." The themes explored in the interviews included the conduct of activities, text engagement, educational goals, litearcy, the teachers' educational backgrounds, and the challenges faced by students when learning literacy and numeracy. The participants' name have been changed to Gabriela(Bucharest school) and Cristina (Ilfov school).

Data were collected from two conveniently selected general schools: one situated in Bucharest and the other in an urbanized rural area of Ilfov County, near Bucharest. In each school, the principal recommended a primary education teacher to participate in the study. The demographic and professional characteristics of the teachers were not considered, as the study's aim was not to examine correlations between practices and contextual or professional variables. Instead, it sought to describe and conceptualize a set of educational practices to establish a useful inventory for future correlational research.

2.3. Data analysis

In this study, I employed a qualitative approach informed by the concepts of James Paul Gee (2011, 2015) to analyze teachers' discourse surrounding literacy practices and students as literacy learners. My analysis was grounded in Gee's framework of discourse analysis and literacy studies, positioning it as a descriptive discourse analysis that delves into themes related to literacy practices. I analyzed discourse as language in use (Gee, 2015; Schiffrin et al., 2008) in relation to literacy.

Gee utilizes a theory of discourse constituted by five interrelated linguistic systems that make a text more meaningful to its users. From the five systems—prosody, cohesion, overall discourse organization, contextualization signals, and thematic organization—I focused solely on thematic organization to understand how teachers discuss literacy. Contextualization signals provided insight into literacy contexts by revealing the cues teachers use to frame their discussions.

In my analysis, I included references to activities from both language and mathematics classes to emphasize the comprehensive nature of literacy as it pertains to both language and numerical understanding, as both can be seen as texts. As Gee (2015) mentions, it is crucial not to reduce reading solely to decoding but to also focus on reading to learn. He highlights that while children may pass early reading tests, they might struggle to learn school content, such as math and science, when it becomes more complex around fourth grade. This connection underscores that literacy extends beyond basic reading and writing skills; it includes the ability to understand and apply concepts in various contexts, including mathematics.

This methodology enabled me to explore how teachers represent contexts and students as literacy learners and users. To derive insights into the contextual characteristics of literacy and students, I conducted a thematic analysis following Saldana's (2009) methodology, which involved iterative stages of coding and thematizing the data. After familiarizing myself with the data, I initiated the coding process using MAXQDA software and adopted an inductive approach to capture the nuanced aspects of the discourse. Following the initial coding phase, I expanded my categories to incorporate additional details, ensuring a comprehensive understanding of the data. In the final phase of analysis, I organized the codes into overarching themes, taking into account the study's conceptual framework while remaining open to interpretations that extended beyond it.

3. Results and discussions

This section presents the analysis and organization of the data into three interconnected themes prevalent in teachers' literacy discourses. The first theme, Narrow Focus on Mechanical Skills, highlights a limited conception of literacy that prioritizes discrete competencies over holistic understanding. The second theme, Teacher-Centered Pedagogy, explores the implications of a pedagogical approach dominated by teacher directives, positioning students as passive recipients of knowledge. The third theme, Deficit-Oriented Framing of Student Abilities, delves into how educators' discourses frequently emphasize students' literacy deficits, perpetuating negative self-perceptions and limiting their engagement with literacy. By framing students through a lens of deficiency, educators risk marginalizing the rich cultural resources that students bring from their home environments. Collectively, these themes describe diverse challenges in the literacy context constructed by teachers. They reveal a prevailing emphasis on mechanical skills, teacher-centered pedagogy, and deficit-oriented thinking, which can marginalize students' diverse experiences and identities.

Theme 1: Narrow Focus of Literacy

In discussing literacy, both teachers, Gabriela and Cristina, frequently emphasize the development of foundational writing skills, such as letter formation, transcription, and other mechanical aspects of literacy. This is also evident in their repeated references to students' difficulties in distinguishing sounds, syllables, and words, as well as their frustrations with handwriting and transcription abilities. The discourse reflects a strong focus on activities like "dictation" and "transcription," prioritizing the mastery of discrete, measurable competencies over more meaningful, contextualized literacy practices.

For instance, Gabriela expresses her goals for the students: "We will learn to read. Clearly. This year, we will learn to write words with printed letters. And if the class allows, I dream of teaching them cursive letters by the end of the year, even though it's not in the curriculum. I know I exceed expectations, but only if the class permits." This aspiration illustrates her commitment to developing literacy skills, yet it also reinforces a narrow understanding of literacy.

By privileging these limited conceptions of literacy, teachers construct a skills-based understanding of what it means to be literate. For example, Cristina states, "This year we will focus a lot on calligraphic writing," which overlooks the multifaceted, socially situated nature of literacy as described by Barton and Hamilton (1998).

This focus suggests that students are often seen as passive recipients of knowledge rather than active constructors of their understanding. By concentrating primarily on mechanical skills, the teachers' language indicates a narrow conceptualization of literacy that emphasizes technical abilities over holistic literacy development. Concerns about whether students can "make a line in the space" for proper letter formation reflect this limited perspective, as do observations regarding students' ability to write numbers correctly.

Focusing on technical proficiency may restrict students' opportunities for meaningful and empowering literacy experiences that transcend mere mastery of discrete skills. Such a critique aligns with the call for inclusive pedagogical practices that honor students' diverse identities and experiences, as highlighted by Kumpulainen and Gillen (2017).

This framing perpetuates a culture where literacy is viewed as a series of mechanical tasks rather than a dynamic, socially situated practice that allows for individual expression and critical engagement. Consequently, the narrow focus on mechanical skills not only constrains the educational experience but also shapes students' identities in ways that may hinder their development as confident, capable literacy learners.

Gabriela further elaborates on the importance of organization: "First of all, we need to work on their organization. We must know which books to take out and how to get all our materials, because they tend to leave things in their desks like last year. They were so surprised that we have to take them! Yes, because older students come and don't have space for their things." She continues, "I don't have big objectives... the main goal is to learn to write correctly. That's what we will focus on heavily. There will be a routine:

dictation. Every day, they will have a short dictation. It will be a huge effort for me, as I will need to check their work."

In summary, the emphasis on mechanical skills in literacy instruction shapes the educational environment in ways that may undermine students' ability to engage with literacy as a rich, multifaceted practice.

Theme 2: Deficit-Oriented Framing of Student Abilities

When discussing literacy and numeracy activities in the classroom, both teachers' discourses predominantly highlight students' deficits and struggles, focusing on their perceived "lack" of preparedness, basic skills, and organizational habits. For instance, teachers express concerns about whether students can "make a line in the space" for proper letter formation and note that "almost all of Ida's numbers are written in the mirror," indicating widespread issues with foundational literacy skills. This deficit-oriented perspective risks constructing students as inherently lacking the necessary competencies for literacy development, aligning with the views of Gee (1989), who posits that such thinking limits students' engagement and identity formation.

An example of this can be seen in Crina's situation, mentioned by Gabriela: "Crina wrote her name with the letters reversed. Writing in mirror form." This highlights the challenges faced by students that teachers often discuss in a negative light.

Moreover, this framing extends to perceptions of family background, where the lack of familial support is viewed as a significant barrier to students' literacy development. Both teachers, especially those from the rural context, lament insufficient support at home, suggesting that students are disadvantaged by unsupportive families. Also, Gabriela reflects this sentiment when she remarks that some students "didn't do anything all summer," which shows a dismissive attitude toward parents and a failure to recognize the valuable resources families can contribute to literacy learning. This echoes concerns raised by Kumpulainen and Gillen (2017) about the disconnect between home and school literacy practices, reinforcing negative stereotypes about family backgrounds and perpetuating the notion that students' struggles stem solely from their home environments.

Additionally, Ida's enthusiasm for school contrasts with the lack of support at home. As Cristina explains: "Ida loves coming to school, but nobody does anything with her at home; she has two cousins who are scattered." This disconnect is compounded by my memory of a previous class visit and Cristina's statement about Ida's mother: "She is only interested when there's a new magazine to buy. She stays with her grandmother." This reflects a lack of engagement with Ida's learning process at home, further emphasizing how the educational context can overlook the potential contributions from families.

The teachers' comments underscore the issues: "Two rules we have: the first word must start with a capital letter, and there must be a period at the end or a question mark. Now, I tell you, and in the second, you write with a lowercase 'c'?" This frustration

towards Andrei's writing habits reflects broader concerns regarding the students' learning environments and their readiness for literacy tasks.

This deficit-oriented framing can be exacerbated by a lack of culturally responsive approaches in the classroom. While teachers acknowledge varying abilities and learning challenges, they often fail to integrate these considerations into their pedagogical practices. This disconnect can lead to a one-size-fits-all approach that neglects the unique cultural backgrounds and home languages of the students, further alienating them from the learning process (Hattan & Lupo, 2020).

When teachers view students through a lens of deficiency, they overlook the diverse strengths and literacy practices these students bring from their homes, further marginalizing those whose experiences and identities do not conform to dominant literacy norms. This aligns with Cairney and Ruge's (1998) critique of deficit thinking, which suggests such perspectives can lead to students being perceived as "weaker" compared to their peers. Challenging deficit-oriented thinking is essential for shifting instructional strategies to honor students' existing literacy practices and cultural identities. Such reframing supports literacy development while fostering an inclusive and equitable learning environment, where all students feel valued and empowered to succeed.

Theme 3: Teacher-Centered Pedagogy

The theme of teacher-centered pedagogy encapsulates several conceptual aspects that unite around the notion of a classroom environment dominated by teacher directives and control. Central to this theme is the reliance on direct instruction, where students are expected to passively reproduce text from the board or textbooks, reflecting a traditional view of literacy as a set of skills to be memorized rather than actively constructed. This approach is evident in the teachers' frequent references to activities like "dictation" and "transcription," which emphasize rote learning and mastery of discrete competencies over more meaningful, contextualized literacy practices.

Additionally, the marginalization of student voices and interests is apparent, as teachers focus primarily on their own observations and assessments while neglecting to actively engage students in the learning process. This lack of attention to individual goals and aspirations implies a disregard for students' agency and individuality. For example, Gabriela reflects on the challenges of maintaining student focus: "They get tired; you see they can't concentrate, so sometimes we incorporate a song or a poem to change the task and give them a break." This shows an awareness of student needs but also highlights the limitation of relying on such occasional diversions rather than integrating student interests into the curriculum.

The researcher (me) finds the idea of using coloring stamps interesting: "I found this idea about the stamp you color very engaging." Gabriela explains how these rewards are part of her strategy: "These are the incentives. I tell the parents how much their children can do for a stamp or a sticker." This points to a transactional view of engagement, where

students may feel that their efforts are only valued in terms of extrinsic rewards rather than intrinsic motivation.

Furthermore, the excessive reliance on structure and control within the classroom illustrates the implications of teacher-centered pedagogy. Teachers emphasize creating a highly structured, routine-based environment to instill a sense of security among students, often prioritizing calligraphic writing and explicit behavior expectations. Gabriela notes, "They have to work quickly and stay on the same rhythm; it's crucial for us to stay on track. If you let them work at their own pace, you won't cover everything." This approach stifles students' natural curiosity and limits opportunities for independent, exploratory learning.

Lastly, the normalization of behavioral compliance is evident through the teachers' strong emphasis on developing organizational habits and behavioral regulation. The insistence on conformity undermines students' intrinsic motivation and self-regulation skills, promoting a culture where obedience is valued over critical thinking and independent inquiry. Cristina states, "I number them to keep track of those who are still lagging behind; it pushes them to keep up, and I can't wait until the end of the lesson to check every exercise."

In a teacher-centered pedagogical context, the student is often constructed as a passive recipient of knowledge, expected to conform to predetermined norms and expectations. This approach fosters a perception of students as homogeneous learners, reducing their individuality and agency. The emphasis on mechanical skills and rigid routines may lead to the development of a fixed identity, where students are viewed primarily through the lens of their deficiencies and compliance. Consequently, students might struggle to see themselves as active participants in their literacy learning, potentially undermining their motivation and engagement (Gee, 1989; Barton & Hamilton, 2000).

This type of learning environment can reinforce a narrow conception of literacy, failing to recognize the diverse backgrounds and experiences that each student brings. By overlooking students' personal interests and cultural contexts, educators risk alienating them from the learning process, inhibiting their capacity to develop critical literacy skills essential for navigating the complexities of their social worlds.

In summary, teacher-centered pedagogy, as represented in the discourse of these educators, reflects a limited view of literacy education that prioritizes mechanical skills and conformity over student agency and active engagement. This approach, while perhaps well-intentioned, risks alienating students and constraining their potential for meaningful participation in the classroom. To foster a more inclusive literacy environment, educators must critically examine their pedagogical practices and consider how to incorporate students' diverse backgrounds and interests into the learning process.

4. Conclusions

This study identifies three main themes that illuminate how teachers' discourses shape literacy practices and influence students' identities as learners. First, the narrow focus of literacy highlights an overemphasis on foundational writing abilities, which limits literacy to technical competencies. Second, teacher-centered pedagogy reflects a classroom environment dominated by teacher directives, often marginalizing student voices and interests. Lastly, the deficit-oriented framing of student abilities reveals a tendency to view students through a lens of deficiency. The aim of this study was to investigate how teachers in two primary classrooms conceptualize and articulate literacy as a social practice, using Gee's theoretical framework on discourse and literacy practices. By examining classroom discourse, the research sought to understand the favored ways educators use texts and language and how these practices shape students' identities as literacy learners. Furthermore, the study explored the implications for creating more inclusive and equitable literacy education that values diverse literacy practices within educational contexts.

The analysis shows that teachers predominantly conceptualize literacy as a set of foundational skills, heavily focusing on mechanical aspects such as handwriting and transcription. This narrow view emphasizes discrete, measurable competencies, limiting the recognition of literacy as a multifaceted practice encompassing social and cultural dimensions. Consequently, students are often seen as passive recipients of knowledge rather than active participants in constructing their understanding of literacy. Contextual characteristics such as the emphasis on mechanical skills and teacher-centered pedagogy significantly shape students' identities as literacy learners. Students may internalize negative self-perceptions and view themselves as inadequate. Furthermore, the framing of students through a deficit lens, compounded by perceptions of family backgrounds, influences how they navigate literacy practices.

According to the romanian national curriculum(Palade et al., 2020), competences are ensembles of knowledge, skills, and attitudes that enable problem-solving in specific and diverse contexts, reflecting a dynamic, situated understanding of literacy. However, teachers' discourse emphasize technical skills like handwriting and transcription at the expense of broader, contextualized literacy practices. This narrow focus risks reducing literacy to decontextualized acts, which, as Draper et al. (2005) highlight, can undermine the integration of content knowledge and meaningful literacy activities essential for fostering competence.

The deficit-oriented framing of students further complicates the development of literacy competence. By viewing students primarily through a lens of deficiencies, educators overlook the cultural and social resources students bring to their learning environments. This perspective contrasts with Gee's (1989) notion of literacy as an apprenticeship into social practices, which requires recognizing and building upon students' unique backgrounds. Similarly, the teacher-centered pedagogy limits opportunities for students to actively engage in constructing their literacy practices.

Instead of fostering a dynamic interplay between teaching, learning, and content, this approach positions students as passive recipients, restricting their ability to navigate and contribute to the Discourses of a literate community.

In connecting these themes to literacy competence in pedagogical practice, the findings underscore the need for instructional approaches that transcend technical proficiency and embrace literacy as a multidimensional, socially situated practice. As Draper et al. (2005) argue, literacy must be contextualized within the content and disciplinary norms that give it meaning. The emphasis on inclusive and culturally responsive teaching is essential for aligning literacy instruction with the curriculum's broader vision of competence. By shifting towards practices that honor students' diverse experiences, educators can create empowering environments where literacy development encompasses not only technical skills but also the ability to engage critically and meaningfully with texts and social practices.

The limitations of this qualitative study stem from its specific focus and methodological approach. As is common in qualitative research, generalizability is not an objective; rather, the aim is to explore particular contexts in depth. Importantly, the study does not consider students' perspectives or examine the curriculum, which may limit insights into the broader impact of literacy practices on learners. Furthermore, the research refrains from addressing external factors that could influence these practices, focusing solely on the themes identified without assessing their potential effects on student engagement or outcomes. This concentrated approach allows for nuanced understandings but acknowledges the constraints of not encompassing a wider range of influences.

Further research is essential to deepen our understanding of literacy practices within diverse educational contexts. Future studies should not only include students' perspectives but also examine the curricular frameworks that influence literacy instruction. Additionally, it is crucial to investigate how teachers relate to and construct connections with students' home literacy practices and backgrounds. Conducting a discourse analysis that accounts for these contextual factors will provide valuable insights into how literacy is shaped by pedagogical practices, curricular demands, and the unique experiences of students. Expanding research across various educational settings and grade levels will enhance our comprehension of these dynamics.

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Predictors of Success in Digital Oratory: Assessing the Impact of an English Digital Oratory Course on Public Speaking Competence

Diana POPA•, Carmen Mihaela CRETU••

Abstract

This study sets out to examine the predictors of success in Public Speaking (PS) within digital contexts, referred to as digital oratory (DO), by evaluating the impact of an English Digital Oratory (EDO) course on high school students' PS competence. Specifically, it investigates how English as a Foreign Language (EFL) proficiency, prior PS experience, and intelligence is associated with PS performance in DO. DO encompasses traditional PS skills while integrating competencies required for virtual engagement and the effective use of digital tools. The study involved a quasi-experimental design, with pre- and post-tests, and a sample of 100 Romanian EFL high school students who attended a six-month EDO course on Google Classroom. Relevant theories, such as educational, EFL, emotional and psychological development, talent and giftedness, and multimedia integration informed our curriculum, framed in Fink's Taxonomy of Significant Learning. The intervention featured synchronous sessions, peer evaluations, flipped classroom methodology, digital technologies, and interactive and learner-centered activities. We measured PS performance before and after the course using Schreiber's (2012) Public Speaking Competence Rubric and our results demonstrated a significant improvement in both expert-evaluated and self-reported PS competence. Intelligence primarily is associated with content-related skills, whereas EFL proficiency and prior PS experience had an impact on overall PS competence. Our findings substantiate the fact that EDO instruction should be an integral part of communication education. The research offers valuable insights into replicable efficient digital oratory instruction in EFL, suitable for students with diverse linguistic and cognitive features.

Keywords: Digital oratory, public speaking, English as a Foreign Language, intelligence, high school

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• PhD student, Department of Psychology and Educational Sciences, Alexandru Ioan Cuza University of Iasi, Romania, dianaepopa@yahoo.com

•• Professor PhD, Department of Psychology and Educational Sciences, Alexandru Ioan Cuza University of Iasi, Romania, carmen.cretu@uaic.ro

Literature review
Digital Oratory

Lind (2012) introduced the term 'digital oratory' (DO) to describe a communication nexus that extends beyond traditional public speaking (PS) by blending conventional rhetorical techniques—such as structured arguments, body language, and voice variation—with the technical expertise required to engage synchronous and asynchronous online audiences. DO stems from English-speaking countries, particularly from the American corporate world (Rossette-Crake, 2020, p. 3), and draws on using English as the Lingua Franca. According to Lucas (2013), the rise of PS competitions in English has helped establish this language as a central educational movement, simultaneously honing communication skills, critical thinking, writing, confidence, and intercultural communication. Exploring the relationship between cultural norms and PS by comparing Western rhetoric traditions, which favor logic and individual expression, to Asian approaches that focus on formality, indirect communication, and collective values, Power and Galvin (1997) concluded that PS education should embrace cultural diversity and equip students with varied rhetorical styles. Rossette-Crake (2019) also believes that DO training should incorporate theatrical presentation skills and sensitivity to cross-cultural values so that students communicate culturally appropriately. Similarly, EFL instruction should develop, apart from language proficiency, a self-motivated, culturally aware environment that breaks down psychological barriers (Mbato, 2020).

Digital communication became a dominant medium during the COVID-19 pandemic. Continuous engagement with a new medium overrides former social structures, individual traits, and cognitive processes (Innis, 2008). As such, DO reflects a broader socio-economic and cultural paradigm housed within digital platforms, which impacts the way speakers interact with audiences and receive messages globally (Rossette-Crake, 2022). The 'new oratory' restructured traditional discourse communities marked by vertical relations, featuring horizontal knowledge-sharing and peer-to-peer support (Rossette-Crake, 2019), as online speakers adopt a great degree of informality, directness, openness, and pragmatism to convey ideas. The rise of video production and consumption led to an increase in the number of speakers and audiences (Rossette-Crake, 2022). Due to multimedia integration in the Communication Act, instructors must devise holistic evaluation methods to account for digital literacy, presentation characteristics, audience engagement, interactivity, and multimedia incorporation. Consequently, these changes should be reflected in the way PS and DO are conceptualized, practiced, and taught in postsecondary education (Rossette-Crake, 2022).

Despite the fact that there is an increased demand for online K-12 education worldwide (Dahana, 2020), research on how effective online instruction is for skills-based subjects remains limited. PS is a skill-based discipline, as it develops student autonomy and independent thinking and comprises pre-assessment, conceptual learning,

practice and feedback, and application, which leads to improved practical cognitive and emotional outcomes (Karimzadeh et al., 2014). While traditional PS has been extensively investigated, studies on DO remain limited, especially at the high school level, where the unique challenges and opportunities of digital platforms have been largely overlooked (Broeckelman-Post & Hosek, 2014).

DO calls for specific, adaptable, technology-based pedagogies to reflect digital literacy and the new communication shifts (Cretu & Popa, 2024). Our research tries to fill the gap in our understanding of how EDO instruction impacts EFL high school students, uncover key predictors of success in DO, and propose educational strategies suitable for varied student profiles.

Theoretical Foundations

Scholars (Eyman, 2015, 2016; Hess & Davisson, 2017; Hodgson, 2019; Jensen & Helles, 2011; Kedrowicz & Taylor, 2016; Warnick & Heineman, 2012) have made significant advancements in the analysis and theorization of digital rhetoric. DO combines traditional rhetorical strategies with digital affordances, such as hyperlinks, interactive media, and algorithms (Eyman, 2015). The DO curriculum should subsequently integrate market-driven and conversational discourse strategies, techniques that create a sense of dialogue, and training in communication technology. Ward (2016) warns against teaching traditional PS online, as it does not accurately prepare students for face-to-face interactions, which should be their main target, while Zappen (2005) suggests the opposite also applies. As such, DO needs to be conceptualized as a new skill-based discipline, distinct from conventional PS practices (Ward, 2016), and should be accompanied by a specific pedagogy (Bailey, 2012; Beall, 2003).

DO reflects both a continuation and a development of traditional rhetorical theories. Traditional face-to-face PS focuses on physical presence, body language, and vocal tone (Baccarani & Bonfanti, 2015), whereas DO involves engaging global audiences by using multimedia tools, managing online feedback, synchronicity, and asynchronicity (Ward, 2016). Eyman (2016) proposed adapting Aristotel's modes of persuasion —*ethos*, *pathos*, *logos*—as well as more recent ones, *kairos,* and *mythos*, to the complexities of online communication.

In the digital realm, where immediacy and authenticity are paramount, *ethos* needs to establish credibility (Ward, 2016) and is achieved through the use of multimedia (Verderber et al., 2014). Since authority now depends less on institutional prestige and more on the speaker's ability to connect with diverse, non-specialist audiences, digital *ethos* extends to building and managing an online identity and receiving endorsement through subscriptions, shares, and likes. German (2017) contends that *logos*, traditionally understood as the logical structuring of arguments and ideas, is now adapted to the fragmented and often non-linear digital consumption, where logical connections are

clearly outlined, and arguments are reinforced with links and multimedia. Online platforms hone *pathos* through interactive features (likes, subscriptions, shares, poles, quizzes, live chats, emojis, visuals, audio, and background music) to trigger emotions and support and compensate for the lack of physical presence.

Kairos, the conventional reference to timing, gains prominence online, where even minor missteps may result in audience disengagement. Speakers are, therefore, expected to timely combine live with asynchronous communication to balance interactions and achieve the intended outcomes (Kalman & Rafaeli, 2006) and choose appropriate communication strategies, particularly when addressing diverse audiences in varied contexts (Morreale et al., 2019). In DO, *mythos* invokes shared cultural values, allowing speakers to connect with their audience through familiar stories and legends that resonate with a collective identity. Technological tools make message delivery more dynamic and presentations more interactive and engaging (Sandars et al., 2008; Smeda et al., 2014).

The *rhetorical canons* have also extended and adapted their functions in online communication (Eyman, 2016). Apart from generating ideas, *invention* tackles multimodality and engagement with online discourse and *arrangement* shifts from linear speaker-controlled organization to non-linear user-accessed structures like tagging and hypertext. *Memory*, no longer confined to mere information recall, is seen by Eyman (2016) as a process of archiving and retrieving digital artifacts. Researchers (Boyle et al., 2018; Jaffe, 2015) argue for more focus on the canons of *style* and *delivery* to secure audience participation on digital platforms, as engagement depends more on technology rather than on the speaker's physical presence. The canon of *style* in DO expands beyond mere word choice into design, incorporating multimedia and interactive elements (Coopman & Lull, 2014) and features a less ornate, more straightforward, and informal register. This approach is particularly important in formats where complex research must be distilled into accessible and engaging content for heterogeneous audiences. The canon of *delivery*, according to Gehrke (2016) and Eyman (2016), transcends physicality, concentrating on how digital tools can establish a compelling virtual presence and ensure audience engagement.

Pedagogical Frameworks and Educational Shifts

DO should be incorporated in PS curricula to train students to master both digital literacy and rhetorical aspects of communication (Lind, 2012). Owing to its wide popularity and accessibility, this new form of public discourse demands scholarly and educational attention, blending traditional rhetoric with digitally adapted approaches to foster continuous learning and interactive engagement (Cretu & Popa, 2024, p. 3). Introducing students to PS from a young age can significantly boost their confidence and reduce speech anxiety (Boyce et al., 2007).

PS training around the globe varies, with countries like the United Kingdom and the United States, and many Asian nations where it is prioritized (National Institute of Education, Singapore, 2017; UK Government, 2014; U.S. Department of Education, 2016). Japan and South Korea, where education favors rote memorization and exam preparation, PS skills lay a comparatively lower emphasis (OECD, 2016; Tsuneyoshi, 2013), while in many parts of the Middle East and Sub-Saharan Africa, there is even less interest in developing PS skills (UNESCO, 2017). PS training is nearly non-existent in Romanian high schools, with only a few debate clubs or EFL classes incorporating it, thanks to individual teacher initiatives, while at the university level, it is often elective.

Given the current lack of resources specifically tailored to online speech delivery, there is a pressing need for innovative pedagogical frameworks (Morreale et al., 2019). The modern academic and professional world demands that students be equipped with effective PS and DO skills, as they are expected to persuasively, dynamically, flexibly and clearly convey ideas online and in-person, synchronously and asynchronously, to professionals and non-experts, transcending cultural and linguistic barriers.

Previous studies

Digital platforms are highly effective for developing communication and language proficiency. Traditional English for Specific Purposes (ESP) tasks, such as structured presentations, persuasive speeches, and role-playing, can be easily integrated into online instruction (Karapetyan, 2020). Butler's (2017) research on online PS instruction found that consistent instructor presence, interactive videos, and note-taking techniques enhance knowledge transfer, boost student engagement, and improve learning outcomes. Interestingly, online students' speaking evaluations scored better than those of students involved in face-to-face training, indicating that digital platforms can effectively replicate traditional instructional dynamics. Yet, Butler (2017) warned that poorly designed online activities can negatively impact learning outcomes.

Recent PS research has shifted towards creative methods for skill development. Yu-Chih (2008) demonstrated that the *Toastmasters Model* is effective in enhancing EFL learners' PS skills by combining PS training with English communication practice in a collaborative setting, fostering self-directed learning through interactive participation. Other innovative training models, such as *TED Talks and TikTok,* proved to be effective in honing communication skills (Edwards, 2021; Kedrowicz & Taylor, 2016) as well as in engaging EFL university students, inspiring them to emulate and innovate the delivery styles of successful speakers (Li et al., 2015).

Digital platforms provide an appropriate interactive, learner-centered environment for EFL students to hone their PS abilities at the high school (Sukma, 2022) and university level (Ramadhani, 2020). Sukma's (2022) Self-Regulated Learning (SRL) model encourages students to actively manage their own learning through goal-setting,

planning, practice and feedback, performance monitoring, and self-reflection, often absent in conventional methods, fostering learner independence and the development of cognitive and metacognitive skills. However, some of the main challenges of online instruction are preserving student motivation and handling anxiety (Ward, 2016). Students feel disconnected, and their sense of isolation is aggravated by the instructor's delayed feedback and a lack of real-time interaction (Yang & Cornelius, 2004), which can impede the development of essential oratory skills which traditionally depend on immediate, face-to-face engagement (Linardopoulos, 2010). Apart from instructors' active involvement, Johnston (2007) advocates for building a supportive online community, as both factors mitigate students' feelings of isolation. Nevertheless, many teachers fail to properly adapt traditional instruction to digital formats. Another problem, common especially in countries with underdeveloped technological infrastructure, is students' limited access to technology and unstable internet connections, which can disrupt instruction (Argawati & Suryani, 2020).

Some studies (Karapetyan, 2020; Ramadhani, 2020; Al-Tamimi, 2014; Westwick et al., 2016)) have shown that apart from boosting communication competence and language proficiency, online PS training is effective in alleviating communication apprehension and PSA. Interactive digital applications, like ORAI and Kahoot!, create a less intimidating yet dynamic and engaging environment for practicing and refining speaking abilities (Argawati & Suryani, 2020). Synchronous online discussions alleviate the anxiety frequently associated with traditional PS contexts (Carraher Wolverton & Tanner, 2019).

Individual self-perceptions and intelligence strongly correlate to communication competence. A study (Kasap, 2021) involving gifted and talented university students, found that higher cognitive abilities act as a double-edged sword, both facilitating and hindering foreign language acquisition. Despite their high cognitive capacities, gifted students' speaking anxiety can affect their communication competence (Rosenfeld et al., 1995). Referring to EFL learners, Hasrul Kamarulzaman et al. (2013) recommended tailored strategies to dismantle psychological barriers that hinder effective communication in students with exceptional abilities. Enriching English curricula with PS activities, such as creative drama or debates can tap into gifted students' advanced abilities and help them improve self-awareness, leadership and communication skills (Chan, 2003; Cramond, 1993).

Digital platforms are suitable for online PS instruction (Dufner, 2022; McGarrity, 2021). Teachers can engage students and achieve immediacy by using cameras and providing personalized feedback during live sessions. Their warm tone, facial expressions, and eye contact can positively impact relational dynamics, a proper pace and precise written guidelines can ensure clarity, while authority and credibility can be

established by clearly communicating expectations, delivering constructive feedback, and using humor sensibly to avoid misunderstandings (Morreale et al., 2019).

Online learning transcends geographic barriers, is more inclusive than traditional education, and can easily be accessed despite inherent obstacles (Yang & Cornelius, 2004). EDO enhances traditional PS by integrating skills like active listening, self-awareness, emotional regulation, and digital literacy with core abilities such as communication, persuasion, and critical thinking, addressing the demands of modern digital contexts (Cretu & Popa, 2024, p. 6). Therefore, EDO pedagogy should blend traditional and digital rhetorical strategies and be mindful of students' cognitive, psychological, linguistic, and technological needs. To accomplish this, our EDO course integrated various educational theories to create meaningful online learning experiences.

Introduction to the Study

Research has demonstrated that structured training can positively impact students' outcomes (Al-Tamimi, 2014; Clark & Jones, 2001; Morreale et al., 2019). Nevertheless, PS and DO training do not have the same impact on all learners. Mastering the art of DO can help us succeed in today's hyperconnected society, ruled by social media, Zoom calls, LinkedIn webinars, and YouTube. DO, as a dynamic blend of rhetoric and digital literacy, improves communication competency while also promoting lifelong literacy development. It extends traditional PS by incorporating skills necessary for engaging virtual audiences, managing digital tools, and navigating online communication platforms. While rooted in classical rhetoric, DO introduces new challenges, such as the integration of multimedia, real-time audience interaction, and adapting speeches for virtual formats (Cretu & Popa, 2024).

Communication competence is a key factor in ensuring people's academic, personal, and professional success (Morreale et al., 2000, p. 1). The outcomes of communication instruction are associated with participants' characteristics, such as EFL proficiency (Al-Tamimi, 2014), prior PS experience (Dahana, 2020), psychological features (Maryansyah & Wadison, 2017; Morreale et al., 1995; Nadiah et al., 2019; Tripudiyana et al., 2022) and cognitive abilities (Mönks & Katzko, 2005; Rosenfeld et al., 1995; Sternberg, 1985)Specifically, the higher the EFL level students have, the better they can adapt to online communication; students with prior PS experience can channel knowledge and skills to digital communication contexts more efficiently, and a higher level of intelligence enables them to create and organize information better.

DO provides a dynamic platform for the practical application of giftedness, where exceptional intelligence, creativity, and task commitment—core elements of giftedness as defined by Renzulli (2012)—converge to enhance communication competence. Gifted learners possess advanced verbal skills and cognitive flexibility, enabling them to adapt

effectively to complex communication tasks and leverage multimedia tools to engage diverse audiences in digital contexts (Kontostavlou & Drigas, 2019; Lucas, 2013). They often demonstrate exceptional creativity and precision when engaging with complex tasks, such as crafting multimedia-rich and audience-adaptive messages (Wan Ng & Nicholas, 2010). Through language training, their intellectual curiosity and motivation drive the integration of rhetorical techniques with digital literacy, fostering deeper engagement and refined communication abilities (Blackburn et al., 2016). Developing these skills requires a holistic approach that addresses intellectual, emotional, and contextual factors, ensuring tailored interventions optimize outcomes in digital communication environments (Bar-On, 2007).

Objective

This research aims to investigate the predictors of success in English Digital Oratory by examining the impact of an EDO course on PS competence among high school EFL students, with a focus on how linguistic proficiency, prior experience, and intelligence shape instructional strategies for diverse learners, providing research-based recommendations for tailoring instructional strategies to meet the needs of diverse learners.

Research questions:

RQ1: What is the effect of EDO instruction on high school students' PS competence?

RQ2: How do *EFL proficiency*, *Prior PS experience*, and *intelligence* levels predict students' success in digital oratory instruction?

RQ3: How do participants' individual characteristics mediate the effects of EDO instruction?

The EDO Conceptual Framework

The EDO course combines elements from established educational theories into a flexible, comprehensive framework. Our course is based on the Constructivist Learning Theory (Bruner, n.d.; Ertmer & Newby, 1993), which supports active participation and collaboration within real-world digital communication contexts and integrates elements of the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006) as well as Mayer's (2009) Multimedia Learning Theory to ensure digital literacy, and to enhance student engagement. To offer differentiated instruction tailored to participants' individual learning styles, and diverse cognitive and psychological abilities, we drew inspiration from Renzulli's (2005) personalized learning model for giftedness, Piirto's (1999) model of self-awareness and emotional regulation, Sternberg's (1985) Triarchic Theory of Intelligence, and Gardner's (1983) Theory of Multiple Intelligences.

The EDO Course Design

The Taxonomy of Significant Learning (Fink, 2003), helped us weave together situational factors, learning goals, assessment, and active learning into the EDO curriculum. EDO includes appropriate educational theories, strategies, techniques, aids, and technologies to maximize student motivation, engagement, and skill development.

We incorporated many elements related to the Agora Speakers International model (Www.Agoraspeakers.Org, 2020), which offers a flexible context for continuous practice, where participants engage in speech delivery, discussions, debates, projects, and evaluations to cultivate persuasion, critical thinking, and leadership. Constructive feedback allows for the progressive refinement of skills across speech types and delivery types. Participants can customize their learning paths according to personal preferences, goals, and strengths by taking on various roles during meetings and doing speech projects of varied difficulty. This way, EDO fosters a flexible, adaptable environment that aligns with diverse learning styles and yields remarkable learning outcomes.

EDO was further refined using the Plan-Do-Study-Act cycle (Park, 2013). During the 'Plan' phase, we analyzed students' baseline forms and tests to set targeted goals, enhancing our methodologies by integrating digital tools such as interactive presentations and online forums. In the 'Do' phase, students participated in live meetings, discussion forums, and online speaking communities and used these tools in speech exercises, group discussions, and multimedia presentations. In the 'Check' phase, we monitored progress through peer reviews, self-assessments, and instructor evaluations, promoting reflection through journaling. This informed the 'Act' phase, where adjustments were made to the course design, incorporating new tools, modifying speech assignments, and intensifying hands-on practice and peer mentoring.

Google Classroom enabled flipped classroom content distribution, scaffolded support, the incorporation of multimedia resources and interactive activities such as role-plays and peer feedback, and collaborative projects to enhance participants' autonomy. We balanced theoretical content and practice with real-time video conferencing, recorded presentations, and self-paced activities. Activities also included games, workshops, reflective journaling, projects, feedback, and iterative improvement aligned with participants' English proficiency and personal goals. To ensure cultural sensitivity, content resonates with Romanian and international values. EDO instructors' varied expertise enriched the course and contributed to cultivating a supportive learning environment across the student groups. The EDO curriculum integrated adapted core principles of traditional PS (Eyman, 2016), namely rhetorical canons, appeals, speech analysis, structure, and delivery techniques, with a focus on multimodal communication and interactive components. A core feature of the course was continuous evaluation and feedback. Tailored rubrics guided participants through self-assessment in the preparation phase and how to provide, receive, and incorporate focused feedback and

assessment into speech performance. This feedback loop was essential for critical thinking and DO skill development as well as for fostering a supportive learning environment.

Method

This study adopts a quasi-experimental design to explore the effects of a six-month EDO course on high school students' PS competence while examining how factors such as EFL proficiency, prior PS experience, and intelligence are associated with their performance. Given the constraints of the educational setting, where random assignment was not feasible due to pre-existing class structures, this approach was considered appropriate. The quasi-experimental longitudinal framework allowed us to examine the course impact on students' PS competence by employing pre- and post-intervention evaluations and ensured our findings apply to similar educational environments. Statistical methods include correlation analysis, regression, and mediation models to explore relationships between individual predictors and performance outcomes.

Participants

The study included Romanian high school EFL students from Colegiul Național Gheorghe Vrănceanu in Bacău, Romania. The purposive sample consisted of 28% male and 72% female, aged 15-17, with a mean age of 15.11 years; 62% were in the ninth grade, 33% in the tenth grade, and 5% in the eleventh grade. Students volunteered to take part in the course, and the inclusion criterion was having a minimum B1 (intermediate) English-speaking level (CEFR, 2020). Out of the 122 EDO course attendees, 100 subjects complied with all research requirements.

Research Design and Measures

We analyzed the impact of three independent variables, *EFL proficiency*, *Prior PS experience*, and *intelligence,* on *PS performance* in digital contexts. While PS competence was the measured variable, it framed within the broader scope of DO, addressing the additional requirements of engaging virtual audiences and using digital tools effectively. We used research-validated instruments to strengthen the accuracy and robustness of the measurements of the variables, and participants filled in pre-test and post-test questionnaires to gather demographic data, self-reported impact, and satisfaction ratings. At T0, we assessed *EFL proficiency* using the CEFR (2020) scale, and intelligence with the Raven Progressive Matrices Test (2003)EFL proficiency was categorized as B1 (intermediate), B2 (upper-intermediate), and C1 (advanced) and treated as an ordinal variable, while intelligence was classified into average, above average (bright), and superior levels and also treated as ordinal.

Students submitted *recorded* speeches at T0 and T1 via Google Classroom and held a *live* speech at T2 on Google Meet for an audience of more than 18 peers and adults. *PS*

performance was independently evaluated by four experts using the Public Speaking Competence Rubric (PSCR) (Schreiber et al., 2012), which has a α = .7 reliability coefficient and a 5-point Likert scale. *PS performance* was measured using the PSCR interval scale to rate criteria such as organization, delivery, or audience adaptation. To ensure consistency in scoring, evaluators participated in a calibration session before grading. The evaluators also standardized their scoring to minimize discrepancies and reinforce reliability and validity. A pilot assessment (n = 10) demonstrated strong agreement among the expert evaluations, with a Cohen's kappa of 0.78. In parallel, students conducted self-assessments for *recorded* (T1) and *live* (T2) *performances*.

Procedure

We obtained approval from the high school to conduct research involving human participants, complied with ethical requirements, and obtained consent from students and legal representatives for data processing, video recordings, and assessment. Following the selection, the 100 EFL students were divided into six groups of 18-20, each led by experienced coaches. Participants attended the EDO course in a standardized manner, the syllabus consistent and uniform across all the groups, and used Google Classroom for resource, assignment, and assessment provision. Prior to the course, coaches received specialized training in EDO fundamentals, digital tools, and PS and DO pedagogy. The data resulting from self-reported questionnaires and expert evaluations was organized in Microsoft Excel and then investigated using IBM SPSS Statistics after being checked for errors.

Data Analysis

To observe changes that can be attributed to the intervention, we used descriptive statistics like mean, standard deviation, skewness, and kurtosis, with the latter two used to assess normality (Cain et al., 2017). We employed Pearson correlations to test relationships between numerical and ordinal variables, while point-biserial correlations were used to assess associations between the nominal variable gender and numerical variables, determining the strength of the associations (Schober et al., 2018). T-tests measured differences in *PS performance* for variables such as *prior PS experience and gender*, and paired T-tests gauged changes in *PS performance* and self-evaluations over time. One-way ANOVA (Ross & Willson, 2017) tested variations across *Baseline* (T1), *Recorded* (T1), and *Live PS performances* (T2), considering *EFL proficiency* as a factor. We uncovered key predictors of success in *PS performance* through linear regression, and by using mixed ANOVA with repeated measures, we evaluated the interactive effects of *intelligence* and test timing. Mediation analysis uncovered the causal connections between improvements in PS performance, the EDO intervention, and the possible factors that influenced this relationship (Hayes, 2021).

Results

The majority of the 100 students, 56%, had B2 (upper-intermediate) *EFL proficiency*, while 34% were at B1 (intermediate) and 10% at C1 (advanced). Among the participants, 49% demonstrated *superior intelligence*, 40% were classified as above *average or bright*, and 11% had *average intelligence* levels. The descriptive statistics in Table 2 show the standard deviations, means, and ranges for the variables (*PS performance*, *EFL proficiency*, *prior PS experience*, and *intelligence*).

Table 1

Descriptive statistics of study variables.

	M	SD	Min	Max	Skewness (SE)	Kurtosis (SE)
Intelligence level	118.62	7.17	100	130	-.18 (.24)	-.57 (.47)
Baseline PS performance	112.87	22.54	64	188	.73 (.24)	1.40 (.47)
Recorded PS performance	130.81	29.87	75	194	.34 (.24)	-.59 (.47)
Live PS performance	132.25	29.08	75	199	.23 (.24)	-.39 (.47)

Note. PS = public speaking.

The table below illustrates the correlations between numerical and ordinal study variables, illustrating the strength and direction of associations with statistical significance levels noted by asterisks. Since gender is a nominal variable, point-biserial correlations were used to assess its relationships with numerical variables, ensuring the appropriate statistical approach. For ordinal and interval variables, Pearson correlations were computed to evaluate their associations.

Impact of the EDO Course on PS Competence (RQ1)

Expert evaluations using Schreiber's (2012) PSCR demonstrated statistically significant improvements in *PS performance* from *Baseline* T0 to T1 and T2. Specifically, the mean PS scores increased from 112.87 at *the Baseline to 130.81 at T1 (t(99) = -7.54, p < .001)* and further to 132.25 at T2 (t(99) = -8.22, p < .001). No substantial differences were found between *Recorded* and *Live PS performance* (t(99) = -1.38, p = .16). These results prove consistent improvement of students' PS competence post-EDO course participation, as well as a gradual decrease in performance fluctuations over time, as illustrated in the histogram below.

Table 2

Correlations between study variables.

Variables	1	2	3	4	5	6	7
1. Intelligence level T0	-	0.1	0.14	0.12	-0.02	0.25*	0.12
2. Baseline PS performance T0	.10	-	0.62***	0.61***	-0.01	0.38***	0.16
3. Recorded PS performance T1	.16	.62***	-	0.94***	-0.06	0.60***	0.28**
4. Live PS performance T2	.15	.60***	.93***	-	-0.09	0.63***	0.24*
5. Gender	.06	-.00	-.05	-.08	.05	-0.04	0.07
6. English level T0	0.25*	0.38***	0.60***	0.63***	-0.04	-	0.38***
7. Prior PS experience T0	0.12	0.16	0.28**	0.24*	0.07	0.38***	-

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; N = 100; PS = public speaking; T0 – first measurement of the variable; T1 – second measurement of the variable All correlations for the gender variable represent point-biserial coefficients. Gender was coded as 0 female and 1 male.

Figure 1

Students' PS performance progression over time
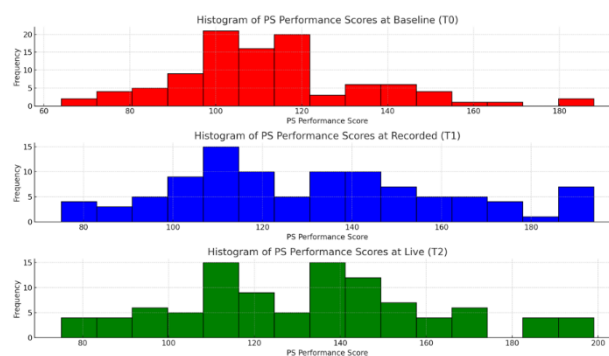
The relationship between EFL Proficiency, Prior PS Experience, and Intelligence on PS Performance (RQ2)

EFL Proficiency: Students with higher *EFL-speaking proficiency* showed better expert-evaluated *PS performance* at all stages. Those with B1 *level* scored lower at all measurement points compared to B2 and C1 level students (*Baseline*: $F(2,97) = 10.90$, $p < .001$; *Recorded*: $F(2,97) = 32.27$, $p < .001$; *Live*: $F(2,97) = 39.27$, $p < .001$). We did not observe any significant differences between B2 and C1 level students, which suggests that after a certain language proficiency plateau is reached, further improvement levels off.

Prior PS experience Expert-evaluated *PS performance* at T1 and T2 was positively impacted by *prior PS experience*, with students who had *prior PS experience* outperforming peers in both recorded (t(98) = -2.85, p = 0.005) and live (t(98) = -2.42, p = 0.017) *PS performances.* Although *Prior PS experience* did not significantly affect *Baseline PS performance,* it had a notable impact post-intervention, indicating that the EDO course facilitated the translation of prior experience into improved performance.

Intelligence: Correlation analysis revealed weak positive relations between *intelligence* and expert-evaluated *PS performance* at T0 (r = 0.104), T1 (r = 0.139), and T2 (r = 0.115). The regression models for T0, T1, and T2 showed low R-squared values of 0.011, 0.019, and 0.013, suggesting that *intelligence* explained only a small portion of the variability in *PS performance* outcomes. *Intelligence* did not have a significant impact on students' *PS performance,* as the coefficients for *intelligence* were not statistically significant at any evaluation points (p > 0.05).

Given these unexpected findings, we investigated whether *intelligence* yields statistically significant changes in *content*-related skills (items 1-6, 9, and 11) or *delivery*-related skills (items 7, 8, 10 and *skilfully uses the camera, the microphone, the background, and the light to convey the message effectively), as identified in Schreiber's (2012) PSCR. Students with *superior* and *above-average intelligence* outperformed those with *average intelligence* in *content* for expert-evaluated *Recorded PS performance* (F(2,97) = 3.56, p < .05) (Figure 2), while *delivery* scores were not significantly different across *intelligence* levels (Figure 3). Similarly, for *Live PS performance*, students with higher *intelligence* scored significantly better in *content* (F(2,97) = 3.34, p < .05), while *delivery* scores showed no significant variation showed no significant variation. This indicates that *intelligence* has a greater impact on *content*-related PS skills than *delivery*.

Figure 2

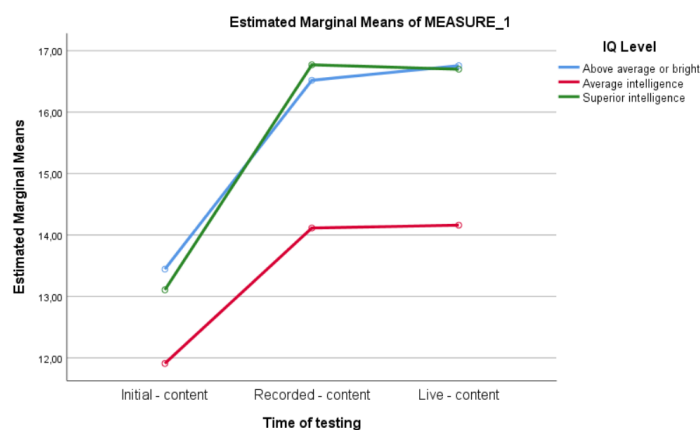*Interaction graph between intelligence and PS Performance for speech content*

Figure 3

Interaction graph between intelligence and PS Performance for speech delivery.
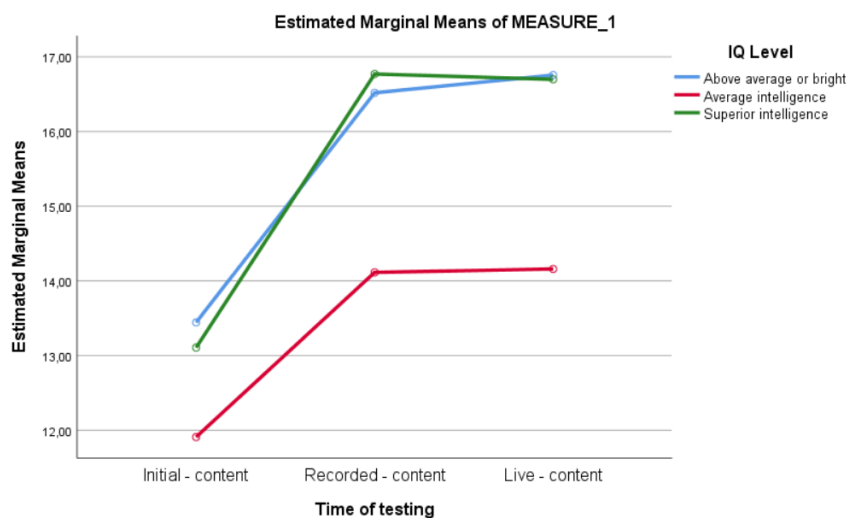
Figure 3. Interaction graph between intelligence and PS Performance for speech *delivery*.

Mediation of Predictors on EDO Instruction's Effect on PS Performance (RQ3)

EFL Proficiency served as a significant mediator and predicted higher self-evaluation at T1 (β = 0.468, p = 0.014), which then led to higher self-assessment at T2 (β = 0.531, p = 0.007). Participants with higher *EFL proficiency* levels obtained better results in both *Recorded* and *Live PS performances*, demonstrating that language proficiency is associated with the effects of EDO instruction on *PS performance*.

Prior PS experience was associated with the effects of the EDO course, resulting in increased self-assessment scores at both T1 and T2 and demonstrated a significant relationship with T1 self-evaluation (β = 0.379, p = 0.014), which then predicted T2 self-evaluation (β = 0.535, p = 0.008). The indirect effect (0.203) suggests that T1 self-evaluation served as a mediator between *prior PS experience* and T2 self-evaluation, indicating that participants with *prior PS experience* made more progress throughout the intervention and derived more benefits.

Intelligence mediated the impact of the EDO course on *content*-related evaluations, with higher *intelligence* levels consistently resulting in stronger *content* performance at each stage while *delivery* remained mostly unaffected. Higher *intelligence* levels consistently led to superior *content* performance at T0, T1, and T2, whereas *delivery* remained relatively unchanged. This suggests that *intelligence* mediated the impact of the EDO course on *content*-related ratings. At T1 (β = 0.498, p = 0.011), *intelligence* was found to predict good self-evaluation, and this association continued through T2 (β = 0.421, p = 0.008).

Discussion

The results of this study demonstrated that the EDO course effectively developed PS skills tailored to digital contexts, aligning with the broader framework of DO. This distinction is essential, as DO builds upon traditional PS while addressing the unique demands of engaging virtual audiences and leveraging multimedia tools. We also found that *PS performance* is associated with *intelligence*, prior *PS experience*, and *EFL competence* to varying degrees. The findings demonstrated the effectiveness of the EDO approach, as evidenced by the significant improvements participants achieved in both recorded and live PS performance, as evaluated by experts and the participants themselves.

Based on the Constructivist Learning Theory (Ertmer & Newby, 1993), the interactive elements of EDO established a participatory learning environment in which students participated in group Webquests, peer mentorship, and debates. The dynamic and encouraging atmosphere that derived from students' active participation explains their marked PS outcomes. We developed a suite of digital resources—including 'My DO Companion,' role cards, and tutorials—that supported students in their preparation and learning. These materials provided step-by-step guidance, access to external resources, and a 'remix engine' (2016) that allowed learners to edit, enrich, and share content, fostering a collaborative and dynamic learning community.

The course fostered core PS skills along with multiculturality, creativity, listening skills, and leadership through structured role-playing and evaluation tasks. Students engaged in brainstorming, role-playing, and storytelling to stimulate creativity and took on roles like 'Meeting leader', which taught them to organize, motivate and lead their peers. Active listening and critical thinking were reinforced through evaluation roles such as 'Listening evaluator,' which promotes attentive participation. We used peer mentoring, collaborative projects, and divergent thinking activities to support cognitive skill development and self-discovery of creativity triggers.

EDO emphasized multicultural awareness by including role-playing, cultural scenario exercises, and discussions considering topics from a range of perspectives. 'Today we travel to' Project (*Www.Agoraspeakers.Org*, 2020) encouraged students to explore demonized or discriminated groups and point out positive, lesser-known aspects of these cultures, promoting empathy and open-mindedness. This approach, combined with virtual intercultural meetings and debates, helped students develop their cultural adaptability and ethical engagement and achieve better EDO outcomes.

Impact on PS Competence (RQ1)

Expert evaluations confirmed that the EDO course led to significant improvements in students' PS competence from *Baseline* (T0) to both *Recorded* (T1) and *Live PS performances (T2)*. The absence of a substantial difference between T1 and T2 suggests that the intervention resulted in marked gains in both *recorded* and *live* speech

competence. Our results reinforce previous research findings (Broeckelman-Post et al., 2019; Clark & Jones, 2001; Linardopoulos, 2010) on the efficacy of structured PS training on online platforms in honing PS competence.

Communication skill training improves self-confidence and self-efficacy, bringing about broader psychological benefits, which empower students both socially and academically (Parris & Estrada, 2019). The incorporation of Piirto's (1999) Model into our EDO design, which emphasizes self-awareness and emotional regulation through peer feedback, emotional check-ins, journaling, mindfulness, and breathing exercises, mitigated learners' performance anxiety. Consequently, students were better able to manage the psychological demands of PS, resulting in improved expert-evaluated and self-perceptions in both *recorded* and *live* presentations.

Our findings are consistent with research on transitioning traditional PS instruction to digital formats, such as Li et al.'s (2015), who demonstrated that the TED Talks model can effectively develop PS skills in an EFL context when students get appropriate feedback and engage in self-directed learning. The EDO approach incorporates speech analysis, video recordings, peer mentoring, invited keynote speakers, and expert assessments. Our participants' improved skills are concurrent with the research (Menzel & Carrell, 1994) which proved that structured practice and feedback in online instruction can replicate the benefits of traditional in-person PS courses. The significant progress observed across performances likely resulted from the strategic integration of technology, guided by the TPACK framework (Mishra & Koehler, 2006) and Mayer's (2009) Multimedia Learning Theory.

The consistent and organic incorporation of technological tools in the EDO course helped students better engage with tasks and each other and prepare better presentations, which elevated their overall performance. This approach mirrors Linardopoulos's (2010) study, which showed that online PS courses can be as efficient as traditional face-to-face ones. EDO made use of Google Classroom management and learning features along with video technology, online research, multimedia presentations, and collaboration tools like Google Docs and discussion forums.

Impact of EFL Proficiency, Prior PS experience, and Intelligence on DO Performance (RQ2)

Participants with higher *English-speaking* proficiency (B2 and C1 levels) outperformed those at the B1 level across all evaluation stages, which is congruent with other scholarly research (Karapetyan, 2020; Ramadhani, 2020). The higher the language proficiency and cognitive resources students possess, the better equipped they are to effectively organize and present their thoughts. Similar findings (Al-Tamimi, 2014; Zhang et al., 2019, 2020) showed that PS instruction contributes to reducing communication apprehension and improving EFL learners' proficiency, particularly in vocabulary, pronunciation, and fluency.

Online synchronous discussions and digital platforms can effectively simulate real interactions and thus train communication skills (Carraher Wolverton & Tanner, 2019). Higher *English proficiency* allows students to engage more with course content, participate more actively, and deliver articulate presentations, as linguistic abilities facilitate understanding and self-expression (Karapetyan, 2020), which is one of the main findings of our research. Given the need for modern speakers to communicate to diverse, multicultural, and multilingual DO audiences, our EDO employed EFL strategies to enhance speakers' communication skills, such as scaffolding, collaborative learning, role-playing, task-based learning, EDO communication forum, instructional study resources, projects, rubrics, videos, and immediate feedback).

At baseline, *Prior PS performance* did not yield statistically significant differences in students' *PS Performance,* which can be attributed to several factors: overconfidence or, quite the contrary, lack of confidence in their abilities, they might struggle with PSA, they engaged with PS in different contexts (according to their initial form), or the skills they developed might not have been sufficient to produce measurable improvements in a more structured PS environment. Despite these unexpected findings, which need to be further investigated, prior PS experience gave participants an advantage over their inexperienced peers at both T1 and T2, demonstrating that foundational skills acquired through earlier exposure can be effectively transferred to digital formats. Our results are consistent with previous studies (Dahana, 2020; Johnson, 2012), which substantiated the impact of early PS training in developing long-term communication competence, as well as studies (Sukma, 2022) on self-regulated learning (SRL) among EFL students, showing that prior knowledge and independent learning strategies have a significant impact on speaking performance. This proves the role of early PS training in establishing proficiency in digital communication.

Participants of all *intelligence* levels showed significant results following the EDO course, which proves the intervention successfully tackled students' diverse cognitive strengths. These results may be attributed to the fact that the curriculum was grounded in the Theory of Multiple Intelligences (Gardner, 1983) and incorporated activities like speech drafting, debates, and visual aids. Renzulli's (2005) model of personalized learning informed individualized pacing, allowing high-achievers to excel through curriculum compacting and advanced project-based learning. Sternberg's (1985) Triarchic Theory added instructional depth by enhancing componential, experiential, and practical intelligence through dynamic speech training, speech analysis, and critical thinking, fostering creativity in impromptu speech and storytelling sessions, and developing practical intelligence through role-playing and real-world scenarios. Gagné's (2000) differentiated model for talent and giftedness inspired our progressive tasks, personalized mentoring, and project-based and self-paced instruction using the flipped

classroom model to meet gifted students' unique needs. Flexible grouping, meditation, counseling, mentoring, and facilitation from caring adults, which we strategically used in our EDO approach have been proven to have a positive impact on gifted students' learning outcomes (Cohen, 2011).

An unexpected result was that EDO participants with higher *intelligence* levels had better expert evaluations for *content* in both *recorded* and *live PS performances*, yet their scores in *delivery* did not reflect the same level of improvement. This suggests that while cognitive ability gives students an advantage in speech writing *(content),* it does not extend to enhancing speech *delivery*. Our insight supports Gehrke's (2016) argument that PS instruction tends to focus more on *content*, often dedicating too little of the teaching time (12% on average) to developing *delivery* skills (p. 247). Our study reinforces the need for an even more balanced teaching approach and/or an extended instruction period, especially for students with high cognitive abilities, to ensure they develop both strong *content* and effective *delivery*.

Mediating Effects of Predictors on DO Performance (RQ3)

Our results revealed that *EFL proficiency* and *Prior PS experience* mediated the rapport between the EDO training and *PS performance*. Participants with higher EFL-speaking ability improved their *PS performance* more, proving how important linguistic competence is in digital communication. Zhang et al.'s (2019) self-efficacy PS assessments of non-native speakers also showed a strong correlation between language proficiency and practical communication skill acquisition.

The challenges of online PS courses include missing face-to-face interaction and reduced audience feedback in asynchronous formats, technological issues, retention, and motivation-related issues (Broeckelman-Post et al., 2019). Our study addressed these problems by integrating both asynchronous and synchronous elements—such as study weeks and recorded speeches, as well as discussion forums and live meetings to maintain student engagement. Students also benefitted from a preparatory session, which offered technical assistance and guidance on creating a proper setup for online presentations. The 'Multimedia evaluator' role assessed how participants managed to create a multimedia experience for the audience and gave specific feedback on their online presence and technical set-up. Google Classroom served as a hub for communication resources, recordings, and assignments.

We addressed potential obstacles by following a contingency plan and providing a standardized syllabus, learning resources, and consistent assessments through Google Classroom across all six EDO student groups. Experienced coaches ensured the high quality of the EDO instruction by participating in monthly guidance meetings, which enabled an exchange of information, support, practice sharing, and continuous

professional development. A constant focus on technological infrastructure and student support helped prevent EDO implementation challenges.

While Westwick et al. (2015) observed that online courses tend to reduce anxiety but have little effect on self-perceived competence due to limited interaction, our intervention led to both anxiety reduction and self-perceived competence, an improvement that can be attributed to the inclusion of larger live audiences during synchronous sessions. Piirto's (1999) model helped us hone self-awareness and emotional management. To mitigate PSA, we employed techniques such as mindfulness, relaxation, and emotional preparation strategies. Students practiced speeches in supportive contexts, receiving feedback aimed at gradually overcoming fears and building confidence in their DO abilities. By incorporating Bandura's (1997) strategies for self-efficacy, students built confidence through constant practice, observed peer performances, peer mentoring and feedback, positive reinforcement, and a supportive learning atmosphere.

Implications, Limitations and Further Research

This study proposes a practical, replicable framework for developing EDO skills and proves that it can be successfully integrated into high school education. We attribute the success of the EDO course to Fink's (2003) Taxonomy of Significant Learning, which enabled us to incorporate in our syllabus integrative learning techniques. The framework allowed us to consider linguistic, cognitive and psychological learning factors to improve participants' EDO abilities while also supporting their deeper engagement with the content, promoting holistic growth. The quasi-experimental design offers a replicable instructional model that delivers personalized interventions aligned with learners' varied proficiency levels. Role-playing ensures skill practice and dynamic learning. By incorporating *live* and *recorded* speaking opportunities, students refine their real-time responsiveness and reflective communication skills in a supportive learning community. The flipped classroom model, combined with scaffolded learning, offers targeted EFL language support and vocabulary development and stimulates self-directed learning, confidence, and autonomy. Culturally sensitive content and emotional preparation strategies mitigate PSA and nurture inclusivity and engagement. Personalized learning paths, curriculum compacting, and peer mentoring challenge high achievers, while supporting learners at all levels. EDO combines expert assessment, self-assessment, reflective journaling, and feedback to enable students to discover their strengths and areas for improvement. EDO pedagogy ensures that all students, regardless of their linguistic, cognitive, and psychological makeup, build strong EDO skills.

One of our limitations is the small sample size of 100 participants, all of whom were Romanian high school students, which may limit the generalizability of the results. This may constrain the statistical power to detect subtle effects, which is why future research

should include more diverse populations. Furthermore, since much of the existing research includes college-level learners, future investigations should replicate the experiment and examine EDO instruction at various levels of education.

Conclusion

Our study demonstrates the potential of DO training to refine and further develop PS competence by examining the positive impact of the EDO course on students' abilities and identifying key individual factors that are associated with performance, namely *EFL proficiency* and *Prior PS experience*. Providing practical guidance for tailoring instructional strategies to diverse learners, our research contributes to educators developing DO programs that effectively address a range of linguistic, cognitive, and experiential profiles.

This study bridges the gap between traditional PS practices and the evolving demands of digital communication, offering a research-based foundation for inclusive and adaptive communication education. It answers researchers' (Lind, 2012; Morreale et al., 2019; Ward, 2016) call for integrating digital communication into PS instruction. Consistent with previous research on structured PS instruction (Morreale et al., 1995, 2019) and the effectiveness of online platforms (Clark & Jones, 2001; Linardopoulos, 2010), our conclusions extend these benefits to high school learners, reinforcing the value of early digital interventions. The EDO model proves its efficacy across both *recorded* and *live* speech formats, replicating traditional PS benefits while addressing the limitations of asynchronous-only PS course formats by improving real-time communication skills (Suwinvattichaiporn & Broeckelman-Post, 2016).

Our research fills a critical gap, demonstrating that digital formats can hone PS competence and are also suitable for lower educational stages. This is consistent with Johnston's (2007) findings, which show that when online courses are designed with interactivity and a sense of community, they can achieve similar outcomes to face-to-face instruction or even exceed them. While Rosenfeld et al. (1995) emphasized the communication strengths of gifted students, our findings reveal that early EDO instruction improves their ability to structure speech *content*. Given the strong connection between *EFL proficiency* and *PS performance,* we recommend that EDO training offer embedded linguistic support, especially for EFL students with lower speaking proficiency levels. Early exposure to PS lays a solid foundation for the development of DO skills, which is why we advocate for the incorporation of EDO training in the high school curriculum.

Data Availability Statement: The data can be obtained from the corresponding author following a reasonable request via e-mail.

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What does science tell us about teaching reading?

Charles TEMPLE•, Ph. D.

Abstract

The article explores the importance of early reading proficiency and its long-term impact on academic and life outcomes, particularly in Romania. Analyzing PISA data, the article highlights significant literacy gaps between advantaged and disadvantaged students, as well as urban and rural learners. These disparities perpetuate intergenerational poverty and limit future opportunities. The importance of early interventions is presented, as research shows that reading difficulties in first grade often persist through later years. Key components of emergent literacy are identified, such as phonemic awareness, letter recognition, word recognition, and story structure. Proven methods like screening tools, phonics instruction, and leveled reading materials are presented, which are critical for overcoming early confusion and preventing reading failure. While research in English offers valuable insights, its has its limitations when applied to Romanian, a language with simpler orthography. Targeted studies are necessary to address gaps in understanding Romanian-specific reading processes, including phonics, fluency norms, and intuitive spelling stages. To advance literacy outcomes, there is a need for stronger teacher preparation programs, interdisciplinary research, and collaboration with international literacy experts. By fostering a research-driven approach tailored to Romanian needs, educators can implement effective strategies to close literacy gaps and ensure all students achieve reading proficiency, ultimately improving their life prospects.

• PhD., Emeritus Professor of Education, Hobart and William Smith Colleges, Geneva, New York USA.
temple@hws.edu

**Does it matter how well Romanian students score on the PISA exam?**

Much of our attention will be focused on Romanian students' PISA scores from 2022. Because PISA is an international measure, some may be interested in Romania's scores compared to those of other countries; but I will argue that students' having or not having the skills measured by the PISA examination is the main thing that should matter to us. I
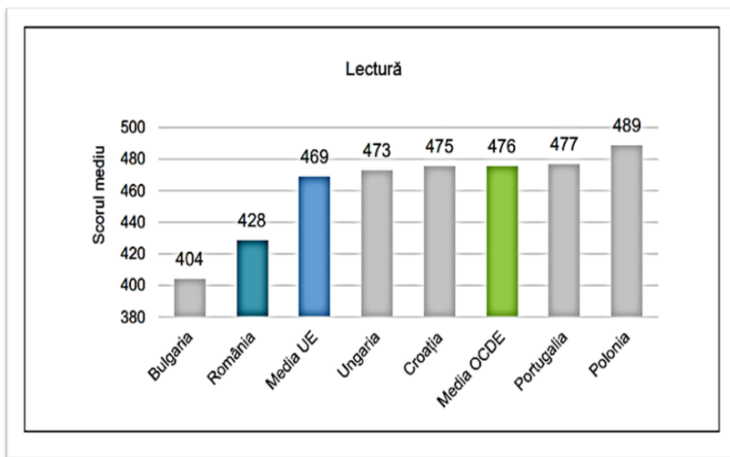
will further suggest there are steps we can take to teach those skills and improve the concomitant outcomes in the future, but there is more we need to know about teaching reading in the Romanian language.

Showing why PISA scores matter is easy. The fifteen-year-olds who took the PISA exam will soon be adults, and the OECD's other testing programs link adults' literacy and numeracy skills to quality-of-life factors, and show pretty clearly that low-scoring students are likely to be shut out of good-paying jobs, to have lower incomes and poorer health, to rely more on public assistance, be less attuned to news that affects them, to vote less often, and to have high rates of incarceration (Governors' Early Literacy Foundation (2023). The charts below from the US *National Adult Literacy Survey* (Kirsch, et al.) are several years old, but they graphically show some of the unfortunate results we are talking about.
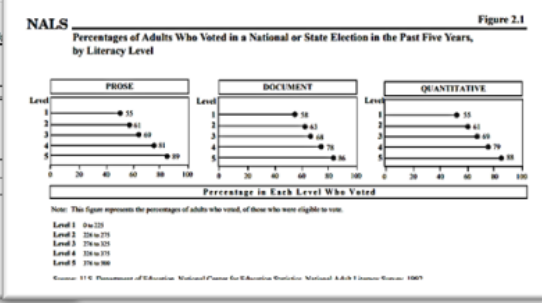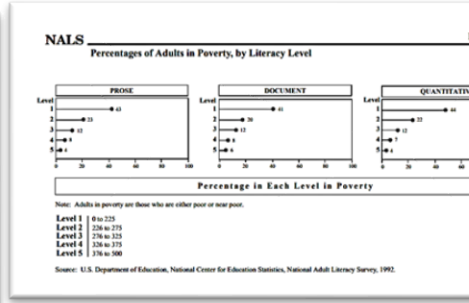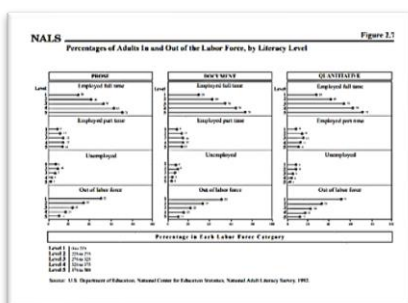
The OECD's PIAAC (Program for the International Assessment of Adult Competencies) suggests that the news is getting worse. When they enter the labor market, those who score below the middling range on PISA will find themselves competing for fewer and fewer jobs, as automation and outsourcing eliminate lower-skilled jobs.

So, yes, we should care about students' performance on the PISA exam.

We should also be concerned about the gap in PISA scores between students from better-off and poorer families. The gap is wider here in Romania than in other OECD countries. Save the Children-Romania estimates that students

Why Skills Matter - Further Results from the Survey of Adult Skills from EduSkills OECD

from advantaged families are three years ahead of students from disadvantaged families. The gap has widened by a year since the last PISA test was administered in 2018 (Dumitrescu, 2023).

There are extreme differences between the scores of children from urban and rural school in Romania (Noveanu, et al., 2023).

Figura 2.13. Diferenţele de scor la matematică, lectură şi ştiinţe între elevii din şcolile din mediul rural şi cei din mediul urban, în România
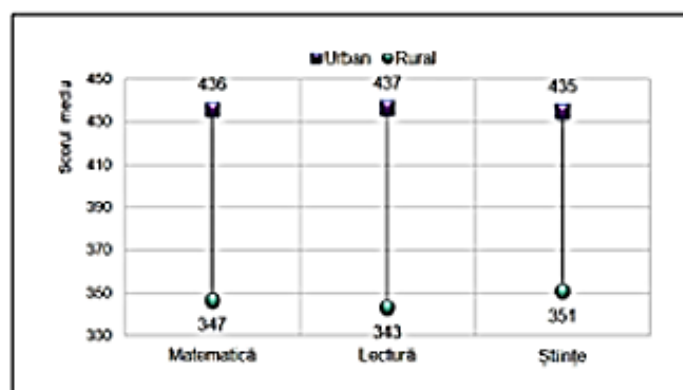
Sursa: Baza de date PISA 2022.

Having consistent groups of under-achieving students either because of their family's income levels, rural status, or both can breed cycles on intergenerational poverty as underachieving students grow up to be underachieving adults whose children are underachieving students, and so on.

But here is a twist: when the people with the very lowest quintile of scores on the US *National Adult Literacy Survey* were asked if poor reading ability was a problem for them, only a third of them said it was. When people in the next lowest quintile were asked the same question, almost none of them said so. We know that low literacy and numeracy skills are likely to be limiting these people's options in life, but if they don't know it, what are they telling their children?

NALS _____ Table 1.2

Percentages of Adults Who Reported Not Being Able to Read or Write English Well, by Literacy Level

	Total Population	Level 1	Level 2	Level 3	Level 4	Level 5
Reading						
Prose	7	29	3	1	0*	0*
Document	7	25	3	1	0*	0*
Quantitative	7	26	3	1	0*	0*
Writing						
Prose	10	34	6	2	1	0*
Document	10	30	6	3	1	0*
Quantitative	10	30	7	3	1	0*

*Percentages below .5 are rounded to 0.

Source: U.S. Department of Education, National Center for Education Statistics, National Adult Literacy Survey, 1992.

As an American educator I can tell you that intergenerational cycles of low literacy and numeracy and poverty are real, they're troublesome, and they're hard to disrupt.

But not impossible. My distinguished colleagues on this panel will tell you how to help older students who are falling behind and how to keep the others on track to becoming functionally literate adults. I will focus on getting younger students off to a strong start as readers.

Start Early

It's likely that the students who did well on the PISA exam are the ones who had already gotten off to a good start years before. It's also probable that most of the students who scored poorly could have been identified—and helped—many years earlier, even in first grade. How do we know those things?

Knowledge from Research

1.   **What's important for the youngest learners?**

Here are some things that research has taught us about reading and teaching reading in English.

We know with some certainty that a child's early confusion over just a few aspects of reading can result in serious disabilities over time. In an often-quoted study, the least proficient quartile of the first-grade readers in one school were identified by testing, and 54 of them were tested three years later. Theirs was an average public primary school with trained teachers, special education programs, and plenty of resources, so it was reasonable to expect that most of the children would be learning well by then. But

> "The probability that a child would remain a poor reader at the end of fourth
>
> grade, if the child was a poor reader at the end of first grade was .88; the

probability that a child would become a poor reader in fourth grade if he or she had at least average reading skills in first grade was .12. The probability that a child would remain an average reader in fourth grade if the child had average reading ability in first grade was .87; the probability that a child would become an average reader in fourth grade if he or she was a poor reader in first grade was only .13. The evidence … indicates that the poor first-grade reader almost invariably remains a poor reader by the end of fourth grade."

But by 4th grade, frustration had set in. The researcher asked one fourth grade student, "Would you rather play a game or read a book?" The boy replied, "Lady, I'd rather scrub the mold around the bathtub than read a book!" (Juel).
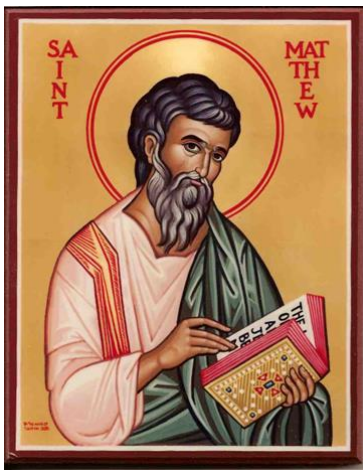
We have a good idea why early success in learning to read points upward and early confusion points downward. Reading skills build on each other, and every skill requires extensive practice to be mastered. But practice takes determination: success fuels it, and failure discourages it. So, a young cognitively normal child who experiences confusion about some early aspect of reading may become a severely disabled reader after a few years, because his confusions discouraged him from practicing, and that led to compounded failures. This pattern has been called "Matthew Effects" after the Gospel According to Saint Matthew: the rich get richer, and the poor get poorer (Stanovich).

We know what some of those key aspects of early learning are

- *the mastery of decontextualized language* (Lowry);
- *competence in the unique language of books* (Stanovich);
- *having concepts about print* (Clay);
- *the concept of word* (Morris; Gehsman and Mesmer);
- *knowing many alphabetic letters* (Morris; Jones);
- *being aware of phonemes in words* (Liberman);
- *making their own discoveries about written language* (Teale and Sulzby);
- *mastering the early stages of word recognition* (Ehri), and
- *knowledge of story structure* (Stein and Glenn).

These taken together go under the term **emergent literacy** (Teale and Sulzby).

2.   **Research has given us ways to help children overcome early confusions, and head off reading failure. These include:**

- screening instruments to identify children who need help with emergent literacy (Morris; Clay);
- teaching and tutoring schemes for emergent literacy (Morris; Invernizzi, et al.);
- books written on stair-stepped reading levels (Scholastic);
- techniques for helping children develop awareness of phonemes, and to help students learn phonics and recognize words (Blachman).

3.   **For older children, research has produced detailed knowledge of reading ability and resources that include:**

How Children Learn to Read Words: Ehri's Phases

Pre-Alphabetic Phase · Partial Alphabetic Phase · Full Alphabetic Phase · Consolidated Alphabetic Phase · Automatic Phase
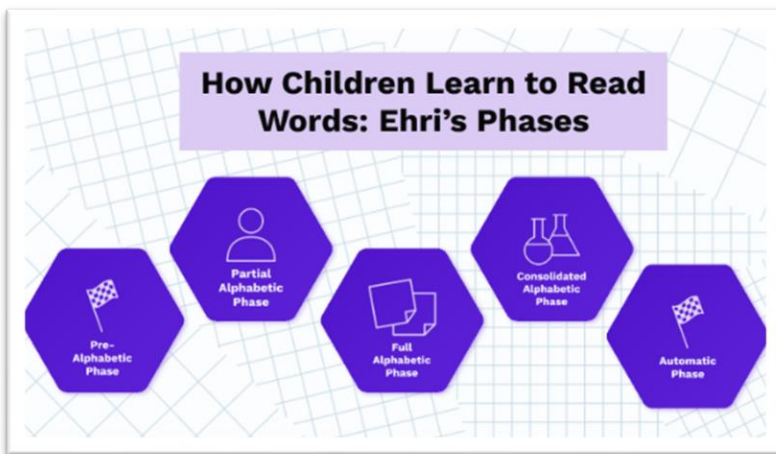
- careful descriptions of English orthography (Venezky; Chomsky and Halle);
- aspects of word recognition;
- stages by which children learn to recognize words (Ehri; Lane);
- stages of young children's intuitive spelling (Temple, et al.);
- step-by-step lesson plans to teach students to read words (Morris; Ganske).
- subskills of reading comprehension (Duke and Pearson);
- instruments to measure reading comprehension (Gillet, Temple, and Temple);
- differences between individual children's vocabularies (Beck, et al.);
- strategies for teaching vocabulary (Beck, et al.);
- strategies whereby writing supports reading (Temple, et al.; Shanahan);
- relations between reading fluency and reading comprehension (Samuels and Farstrup);
- expected levels of reading fluency per grade level (Hasbrouck and Tindal; Zutell and Rasinski);

Hasbrouck & Tindal Oral Reading Fluency Data

Matching Readers With Text — Lexile reader measure 540L; Rally for Recycling 480L; Ron's Big Mission 540L; Judy Moody Saves the World 570L

- strategies for teaching children to read fluently (Rasinski);
- thousands of books on different levels and in different genres (Scholastic);

- relation between the amount of reading children do and reading ability (Allington and McGill-Frantzen);
- genres of books children need if they are to become versatile readers (Duke);
- detailed criteria for leveling the books (Chall, Lexiles);

- studies of the ways different SES groups use language and literacy with their children at home (Heath; Hart and Risley);
- measures of how many minutes fifth grade children practice reading in a day;

- studies of the ways written language is used in different disciplines of study (Schleppegrell);
- studies of the reading acquisition of language-minority children and ways to teach them (August, Slavin);
- measures that show surprising differences in the verbal intelligence and the "world knowledge" of people who have the habit of reading and those who don't (Cunningham and Stanovich).

Periodically, research on reading and writing is summarized in voluminous *handbooks.* Each volume may be quite different from the last, as research rolls on to new discoveries.

Is knowledge from research in English useful to teachers of Romanian students, though?

The general ideas from the above list are applicable in the Romanian language, as they are in other languages with alphabetic writing systems. Many of the teaching strategies mentioned were used in the REFINE project funded by OSI and the World Bank in Romania and five other Central European countries from 2005 to 2008. The strategies are still

used with embellishments in the *Scoli cu ScLipici* teaching initiatives of the *Noi Orizonturi* Foundation here.

But the finer points of English language-based reading research do not travel well. An Israeli literacy expert (David Share) complained that English has an "outlier orthography," and even though research in English reading tends to dominate the market, he warned that relying too heavily on studies from English could be "perilous."

Then how do we avoid the perils? If you agree that the knowledge we just surveyed might be useful to have in the Romanian context, you might ask what we know about teaching reading in English that we don't yet know about reading in Romanian, and should.

As we worked on the REFINE Project, and then with the *Scoli cu ScLipici* initiatives, questions arose about aspects of learning to read in Romania and in the Romanian language that did not appear to have answers yet:

- **Emergent Literacy:** Based on the available science, what are the best ways to teach early reading in Romanian, that balances *concepts about print, phonological awareness, phonics, spelling, word recognition, vocabulary development, comprehension*, and *writing*?

- **Intuitive spelling:** What are the stages of children's intuitive spelling in Romanian? How do we assess them? What will they tell us about children's developing knowledge of orthography, and their ability to recognize words? Has anyone looked at this?

- **Phonics:** What are the patterns of Romanian orthography that are most useful to point out to children at different levels? With what emphases, in what order, and with what methods should we most productively teach children to read words in the Romanian language? How do we know?

- **Levels:** Books used in schools need to be written on specific difficulty levels so that children of different ages can understand them. What are those levels in Romanian text? How do you describe them exactly to writers, and measure them precisely for teachers and parents? Does anyone know?

- **Fluency:** We are told that reading fluently is important, but what does that look like in Romanian? What should the targets be? How many words are average children able to read correctly per minute in each grade level in Romania? Does anyone know?

- **Genres:** What genres of texts are available for students to read at different grade levels here? How should we teach students to read in each of the genres? Has anyone looked into this?

- **Reading materials:** We know that children should be given many pages of connected text at each grade level to have the practice they need to become proficient readers. How many pages of materials are provided for children to read in each of the Romanian primary grades?

- **Family literacy:** What could we learn from studying the home language and literacy environments of different SES groups in Romania?

- **Disciplinary literacy:** What are the language challenges of texts written for different disciplines, and what are the best strategies for helping students meet them?

- You surely have other questions of your own, too.

How do we answer these questions?

Most of what we know about reading in English came from research, of course. But here's an aside from the sociology of science that may be offensive to some—and if it is, I apologize, but I hope you will see the point.

When you train teachers for primary grades in normal schools, but you train teachers for the secondary level in universities, the university faculty will give you research on educational topics like philosophy, history, and psychology and perhaps on teaching subjects at the secondary level, because faculty at universities have research in their job descriptions: "Publish or perish." But you will get very little research into primary level-teaching, because faculty in normal schools aren't expected to do research. It's not that reading in the primary years isn't important; it's just that beginning reading has stayed out of the spotlight because of the way teacher education and research have been organized.

In the US, we had high school-level normal schools from 1839 until the late 1920's, and from then to the mid-twentieth century, our normal schools made a slow transition into teachers' colleges. Later some of them were folded into universities or became universities themselves. Though there had been some investigations by experimental psychologists into reading processes in general—notably Edmund Burke Huey's *Psychology and Pedagogy of Reading*, published in 1908--research into reading and reading instruction in the primary grades only got serious in the 1950's and 60's, when universities began preparing teachers for the lower grades and professors had to publish research about primary education to keep their jobs and be promoted.

A key ingredient to most reading research has been the practical aspect. Teachers' colleges often operate laboratory schools, where teachers-in-training get to practice what their professors preach. Many universities operate "reading clinics," where parents bring

their children for testing and teaching. Research on reading education is almost always expected to involve interventions with students, and better yet, to compare interventions against the progress of control groups.

To give you an example, the School of Education at the University of Virginia in the United States houses the McGuffey Reading Center, a clinic where children come and have their reading assessed one-on-one by a graduate student in a testing room with a one-way mirror, while other graduate students and the professor observe from another room. In the afternoons, children come in for one-on-one tutoring by the graduate students, supervised by the professors. The graduate students have long classes twice a week in which they review what they learned from testing and tutoring, and try to square it with what they read in research articles. They have another weekly seminar where they read and discuss recent or classical research and theoretical works. They take courses in other departments on educational psychology, research methodology, statistics, linguistics, psycholinguistics, cognitive psychology, literary theory, and such. The Reading Education department offers a donor-funded lecture series twice a year that brings in the most insightful researchers from outside. And doctoral students do research and write dissertations.

Interdisciplinary collaborations have been important, too. What we know about emergent literacy came about through partnerships with educators, psychologists, linguists, and sociologists. The most important research on reading comprehension has come from collaborations between educators, cognitive psychologists, and literary theorists. Many of the ideas that formed the Reading and Writing for Critical Thinking project which engaged hundreds of teachers in Romania came from a partnership between reading educators and professors of philosophy.

How do you prepare teachers to teach reading?
Like graduate education in literacy, training teachers blends the theoretical and the practical. In most of the US, students preparing to be primary teachers must take at least three courses in the teaching of reading (each course meets for 45 hours in a semester) and have extensive practice in school classrooms. Secondary teachers may or may not be required to take literacy courses depending on the state in which they live, but courses on teaching reading in the content areas are available to them. They also must have extensive practice in school classrooms.

A typical course on teaching reading may have the whole class go out and work with children in a local school two mornings each week, then come back to a seminar on campus to discuss the experiences and relate them to class reading assignments.

For a full semester in their final year, each student takes over a class and teaches full time in a local school, with weekly supervisory visits from a university professor or other staff person.

Books!

Comprehensive textbooks used in teacher-training courses are written by university professors, and their publishers typically have juries of other university professors review the manuscripts to ensure that the information in them is accurate and up-to-date. Textbooks for courses are usually published in updated editions every three to five years. Most are now available online and in print.
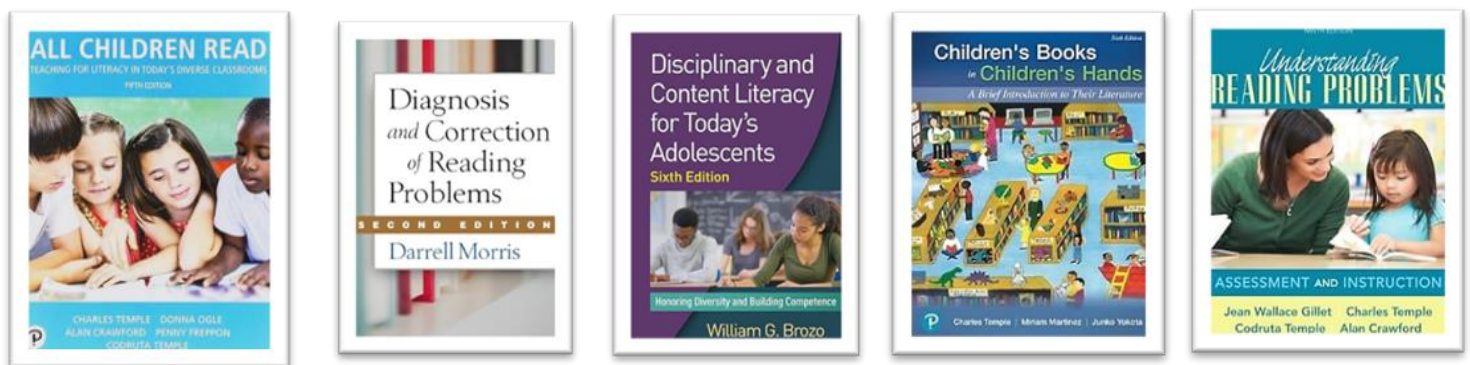
Other single-topic books may be written by professors or classroom teachers. Schools or individual teachers purchase these books for teachers to use.
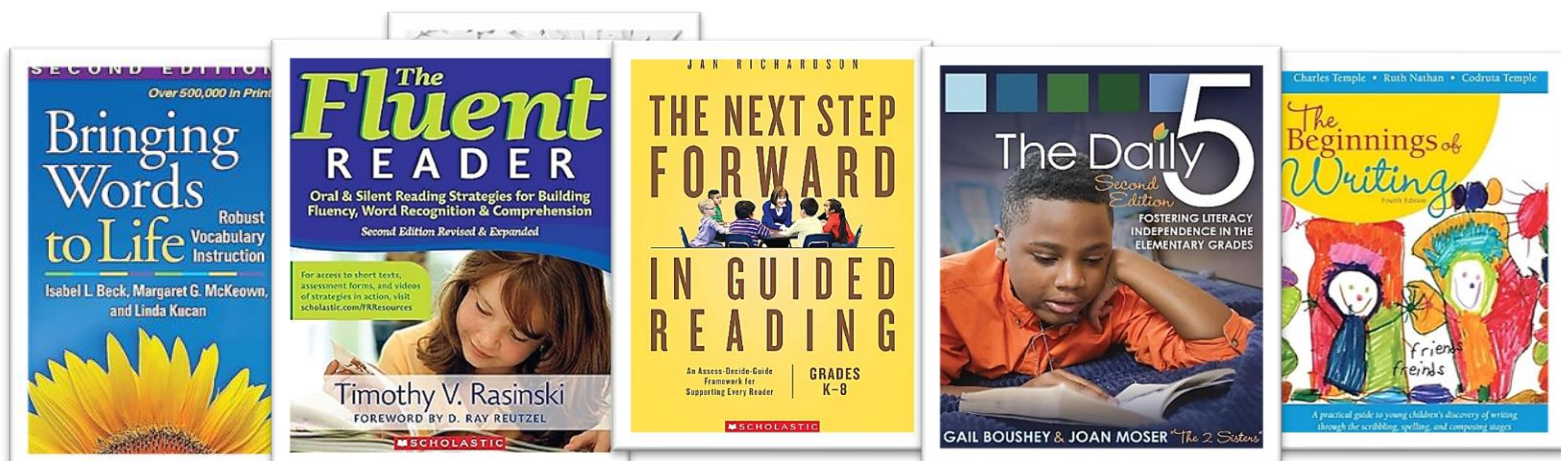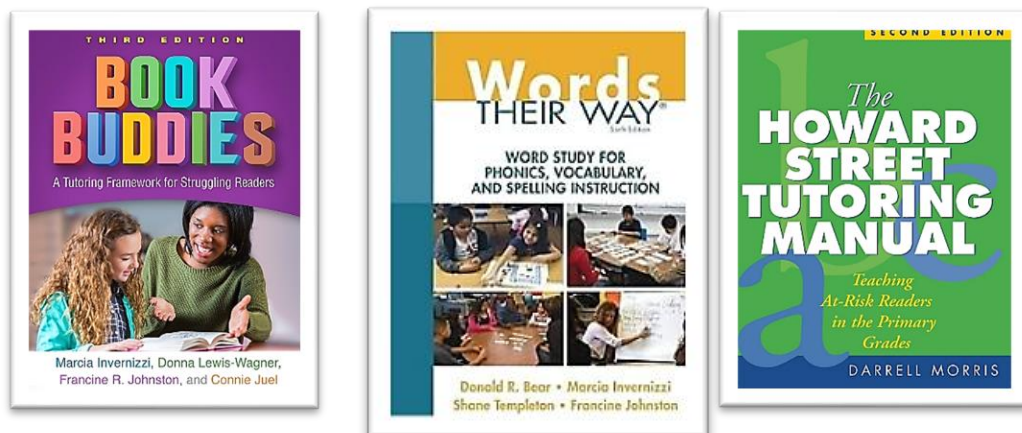
Service Learning.

Service learning is popular with university students. At my school, the America Reads tutoring program is open to any interested student regardless of major, and gives students several hours of training before having them tutor children in local schools two hours each week. The key is to give the tutors tightly scripted lesson plans each day, and have a trained supervisor for every eight tutors. Our America Reads program engages 100 tutors at a time, and has run continuously for 30 years.

Who does reading research in Romania?

Many, if not most, of our American universities have graduate programs that focus on literacy—offering courses and conducting research by professors and by doctoral students. Many classroom teachers pursue "action research," in which they try new instructional procedures. They may share their results within their own schools, at conferences, in articles published in educational journals, or in books for other teachers. There are three major national and international associations and many smaller regional groups that focus on literacy—the International Literacy Association, The National Council of Teachers of English, and the Literacy Research Association. They all host conferences on instruction and research. They publish journals, sometimes several for different audiences from each association. The International Literacy Association has "special interest groups" of researchers, many of whom are willing to collaborate with international colleagues to conduct research outside of the US.

Who does reading research in Romania? Who will in the future?

What international collaborators help?

What journals publish the research?

At what conferences is the research shared?

How does the research influence policy and teaching practice?

How do children and future adults in Romania benefit from the efforts?

How do educators in other countries benefit from what you learn here?

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General section

Valuating the Effect of Toulmin Argumentation Model on Critical Thinking and Epistemological Beliefs in Online Education

Salih GÜLEN•, İSMAIL DÖNMEZ••

Abstract

This study investigates the effectiveness of the Toulmin argumentation model in developing critical thinking skills and epistemological beliefs concerning the internet in an online educational setting, especially during the global coronavirus pandemic. The subject of the research was carried out in the "Child Development Department" of a state university with the participation of 68 volunteer students, mostly from Eastern and Southeastern Anatolia, aged between 19 and 25. It employed quasi-experimental design in the course of the ten weeks in the 2020-2021 academic years. Data were collected through online tests and evaluations during child science and technology lessons focusing on various spatial and contemporary scientific topics. Students' critical thinking skills and epistemological beliefs were according to predetermined scales, and were analyzed using SPSS 22. Differences between the control and experimental groups were not significant for critical thinking skills or epistemological beliefs. This suggests that the implementation of the Toulmin model in an online format did not have any significant effects on these areas. Further, a very weak correlation between epistemological beliefs and critical thinking skills emerged, indicating that these constructs can work independently in online learning contexts. The results stress the complexities behind promoting critical thinking and epistemological beliefs in online learning environments, making it imperative to involve new theory in the integration of argumentation models, such as that of Toulmin's, into online education. The study seems to offer valuable theoretical guidance to the teachers and curriculum developers to effectively embed critical thinking and epistemological understanding in the digital age of education. Future research will involve longer interventions, diverse samples, and innovative strategies of teaching to affect epistemological beliefs and create opportunities for critical thinking in digital learning spaces.

Keywords: Argumentation, Online education, Epistemological beliefs, Critical thinking

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• Associate Prof. Dr. Muş Alparslan University, s.gulen@alparslan.edu.tr ORCID: 0000-0001-5092-0495
•• Associate Prof. Dr. Muş Alparslan University, i.donmez@alparslan.edu.tr ORCID: 0000-0002-7792-0169

Introduction

With the global pandemic of COVID-19, the learning continuum has observed a complete change, wherein online learning came in as a viable alternative for the formal classroom learning (Telli & Altun, 2020). This paradigm shift, which primarily aims to ensure the continuity of educational activities for students, has gained ever-growing significance. The effectiveness of stages of online education is indeed a most important issue. There is an urgent need to measure and assess the effectiveness of online schooling, especially as compared to traditional face-to-face classrooms, considered as much more economic. In this context, the present study sets out to investigate the processes of students' argument construction and participation in argumentation in the online learning environment. Particularly, it studies the detailed influence of students' epistemological beliefs about the internet and their critical thinking skills in the online learning process. The research assumes that if online education proves sufficiently effective, there might be a shift to wholly online courses at some point in the future.

Literature Review

Epistemological beliefs towards the Internet

The development of technology has given the opportunity to increase technological innovations and to use them especially in the educational environment. Internet, which is one of the technological innovations, has captured almost every stage of our daily lives. The internet provides the user with the convenience of accessing all kinds of information and can provide online participation in many activities that can be done simultaneously such as messages, mail, news, and communication (Yılmaz, 2016).

The epistemological belief of the Internet refers to beliefs that individuals bring to bear regarding the nature of knowledge-how it should be achieved and measured in the data available online. Given the rising prominence of the Internet in knowledge distribution and belief formation, this very notion has attracted much interest. Users' belief in the structure, source and certainty of this information and access shows the individual's epistemological belief towards the internet (Kılıç-Çakmak, et al., 2015). Moreover, there is evidence that there is a relationship between individuals' epistemological beliefs and their preferences for internet-based learning environments (Tsai & Chuang, 2004; Lee & Tsai, 2005). Research has shown that individuals' epistemological beliefs play an important role in shaping their online information seeking strategies and their ability to critically evaluate the reliability of online information (Zimmermann et al., 2022; Yılmaz & Çakmak, 2016). For example, individuals with developed epistemological beliefs are more likely to use effective search strategies and critically evaluate the information they encounter online (Chua et al., 2020; Tsai, 2004). It shows that epistemological beliefs not only affect information seeking behavior but also affect individuals' learning experiences in online environments. Moreover, the rise of personalization on the Internet has been identified as a factor that can control and limit

the information that individuals consume, thus affecting their epistemological beliefs (Pariser, 2012). This highlights the potential impact of online personalization in shaping individuals' understanding of knowledge and information. It shows that individuals' epistemological beliefs play an important role in shaping their interactions with online information, influencing their information seeking strategies, learning experiences and decision-making processes. Understanding and studying these beliefs is essential for promoting critical thinking, effective information evaluation and informed decision-making in the digital age.

Critical Thinking

Critical thinking in education is a very useful skill, which has enjoyed more attention since recent years. It has been recognized as an indispensable ingredient of quality education within fields as diverse as economics and political science. Despite agreements about the importance of critical thinking in education, there is major disagreement with regard to its precise definition and the manner in which it should be taught and assessed (Pasquinelli et al., 2021; Stassen et al., 2011). Critical thinking is a mental process in which an individual can analyses the information he/she has acquired and use and evaluate the ways of reasoning (Gülen, 2019). The concept of critical thinking is multifaceted with different interpretations and applications in educational settings (Kahlke & Eva, 2018). It is about the criticality behind the analytical process of one informing alternative solutions and reflecting on one prejudices thus providing thought process that is overly complicated due to diverse experiences in learning (Johnsen et al., 2012). It is one of the most important qualities to acquire for productive management and quality education in and of itself (Kettler, 2014). It is believed that emphasizing critical thinking in teacher education will lead to a critically thinking society at all levels and enable more effective problem solving in society (Allamnakhrah, 2013). Furthermore, critical thinking is considered crucial for decision-making and lifelong learning, emphasizing its role in personal, professional and societal change (Walker & Brown, 2020; Casiraghi, 2017). The application of critical thinking in higher education is seen as a way to promote students' lifelong learning and develop their speculative and creative thinking abilities (Ning & Dan, 2017).

Critical thinking towards the Internet is a very important skill in the digital age because the Internet has become the primary source of information on various aspects of life, including health, education, and social participation. Critical thinking is another skill that needs to be emphasized in open education processes. Since the information provided in the online process is independent of the social environment, the individual should learn in a way that is open to innovation and constructive knowledge in an environment of interaction and discussion by being excited without robotization (Arslankara & Usta, 2020). In the smart classroom environment, attention has been drawn to the impact of the Internet on students' critical and innovative thinking (Xing & Lu, 2022). In the field of digital literacy, the need to develop a culture of critical thinking to engage with internet

content, especially among students, has been emphasized (Tınmaz et al., 2022). This is supported by the claim that Internet literacy should encompass critical thinking due to the blurring of boundaries between virtual and real, work and leisure, and public and private spheres (Setiansah et al., 2021). In other words, it is the ability to recognise both the good and bad aspects of information. The implications of and for the notion of secondary education have thus fundamentally challenged the development of appropriate learning outcomes and criteria for its assessment within educational environments (Donnelly, 2018). Beyond that, a challenge facing critical thinking is a widely held belief that, while it is very much needed, critical thinking education methods presently in use continue to evoke question as to their effectiveness, thus calling for further works in this regard (Pasquinelli et al., 2021). It is a matter of curiosity whether the individual's belief in the internet is critical in terms of internet use. In particular, it is aimed that students are aware of the positive and negative aspects of internet use and online education.

Argumentation

The Toulmin Argumentation Model, introduced by Stephen Toulmin in his book The Uses of Argument (1958), provides an effective framework for constructing arguments through structured components such as claims, justifications, data, qualifiers, rebuttals and support. This model contributes to the development of argumentation skills by enabling students to follow a structured path in the analysis, evaluation and justification processes and is widely used in educational settings (Sampson & Blanchard, 2012; Erduran et al., 2015). The model form will instill analytical skills which allow the development of critical thinking by encouraging students to formulate arguments that are well justified and supported with reason. The Toulmin Model is thus regarded as a mighty tool to develop skills for critical thinking and finds application across many disciplines.
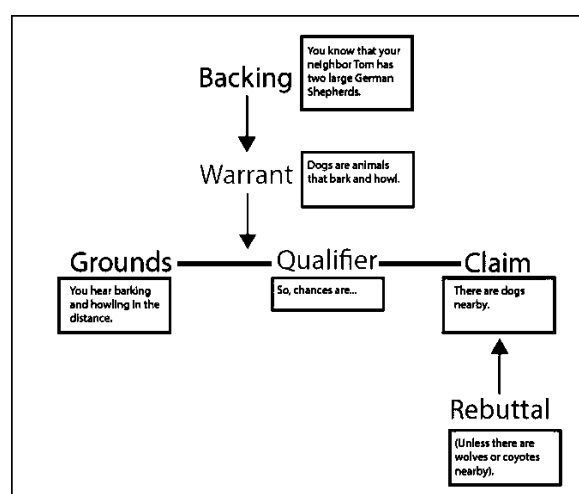
Figure 1. Toulmin Argumentation Model

The model in Figure 1 was developed by Toulmin. According to this model, the opinion or solution proposal put forward to find a solution to a certain problem is defined as claim, observations and facts used to support the claim are defined as data, reasons supporting the claim are defined as justification, giving examples to strengthen the justification is defined as support, positive aspects and pros of the claim are defined as qualifiers, negative aspects, cons and refutations are defined as refutations. Based on this model, the participants are expected to engage in the argumentation process and develop their critical thinking skills by using the information they have acquired online with the influence of their epistemological beliefs about the Internet. Basically, an individual is expected to form arguments about a topic or idea by using the knowledge he/she has acquired. When we analyze arguments, wherein one is describing claims, with some form of justification or support provided/indicated for the data with such claims, these are the arguments developed during this process, which is thus referred to as the argumentation process (Gülen & Yaman, 2019)

Different studies say that the use of the Toulmin Model in academic settings facilitates critical analysis and reasoning due to its huge effect on them (Lytzerinou & Iordanou, 2020; Nussbaum, 2020). Research emphasises that this model can guide students to critically evaluate knowledge through structured argumentation and that the model can be adapted to online environments such as virtual science learning (Acar & Azaklı, 2023; Telenius et al., 2020). Especially in online education, it has been stated that argumentation can broaden students' perspectives and deepen the understanding of classroom practices (Telenius et al., 2020). In addition, teaching argumentation skills has been found to have a positive effect on students' cognitive skills such as critical thinking and metacognitive abilities (Acar & Azaklı, 2023). In addition, the use of digital concept maps in argumentation conflict resolution studies has the effects of improving students' discussion skills and domain-specific knowledge (Kapshuk & Alt, 2022). The relationship between students' prior knowledge and online learning approaches on inquiry and argumentation skills is emphasised and it is stated that insufficient prior science knowledge limits the construction of quality arguments (Yang et al., 2015). The effectiveness of argumentation-based teaching strategies in improving students' understanding, reasoning and decision-making skills is also supported by research findings (Widodo et al., 2023). Students are expected to produce knowledge-based arguments and engage in the argumentation process.

Critical thinking is a core competency defined as the process of actively analysing, synthesising and evaluating information to make informed decisions in education (Ennis, 1996; Kettler, 2014). This skill plays an important role in education as it enables students to evaluate complex information and make inferences from various learning experiences. Educational approaches that promote critical thinking often include elements of discussion and questioning; these methods encourage students to question assumptions, seek evidence and refine their conclusions. The Toulmin model is aligned with critical thinking frameworks such as Bloom's Taxonomy and Ennis' theory as it offers a

structured argumentation process to develop students' critical thinking skills (Ning & Dan, 2017). The Toulmin model is considered to have the potential to support students to develop a critical approach to online information because it promotes the competencies of analysing and questioning information and developing counterarguments (Sampson & Blanchard, 2012; Erduran et al., 2015).

Research has shown that when students interact with Toulmin's model, especially in educational settings, it can influence their epistemological beliefs by promoting a deeper understanding of the nature of scientific and argumentative reasoning. A study that found that the use of a Toulmin-based argumentation model with epistemological content improved students' epistemological beliefs compared to traditional curriculum methods suggests that open discussions about knowledge within Toulmin's framework facilitate more detailed beliefs about knowledge (Kızkapan & Bektaş, 2021). Another analysis of Toulmin's model argues that it provides a flexible approach to understanding argument structures while avoiding the pitfalls of epistemological relativism. This supports the idea that Toulmin's framework promotes a balanced and critical perspective that can develop sophisticated epistemological beliefs about the standards and structure of knowledge (Bermejo-Luque, 2004). Having calculated this, research shows that the use of the Toulmin argumentation model could support students' development in the understanding of advanced epistemological ideas, as seen through their exemplary reasoning and metacognitive skills (Bromme et al., 2010). Additional research indicates that the Toulmin Model in a digital environment helps students' epistemological beliefs toward knowledge. In this context, it is believed that structuring discussions using the Toulmin Argumentation Model has the potential to build students' confidence and critical perspective regarding knowledge online. This study examines the Toulmin model in both critical thinking and epistemological beliefs concerning the Internet within the online academic context.

Relationship Between Argumentation, Critical Thinking and Epistemological Beliefs

Useless arguments are rather preparatories for individuals to rationalize and defend their opinions. In other words, critical thinking is a vital act that enables the life of argumentation. While critical thinking encourages a researcher or scientist to analyze and evaluate information, to conclude these abilities to be put into practice, an argumentation framework becomes necessary (Akbaş, 2021; Lukitasari et al., 2022). Evidence has shown that argumentation is effective in developing critical thinking skills. For example, in a study directed at digital argumentation performance, a high correlation was found between students' critical thinking and argumentation skills (Lukitasari et al., 2022). Argumentation-based teaching approach was also revealed to enhance students' critical thinking and argumentation skills (Akbaş, 2021). In summary, the Ability to Argue promotes the process of critical thought. Critical thinking also works on the processes of

argumentative writing. The Argument Based Inquiry (ABI) model positively influenced the critical thinking skills of the students (Nazila et al., 2019). While such models improve students' argumentation skills, they also reinforce their critical thinking skills. The relationship between argumentation and critical thinking has also been examined with variables such as gender differences. They found that the ADI model increased critical thinking skills in both male and female students (Nazila et al., 2019). This suggests that argumentation can improve critical thinking regardless of gender.

Individuals' epistemological beliefs shape their commitment, quality and approach to argumentation. For example, individuals with more sophisticated epistemological beliefs, such as those who view knowledge as constructed and evolving, are more likely to engage critically and constructively in argumentation (Nussbaum & Bendixen, 2003). It has been discovered that the epistemological beliefs that people hold affect how they deal with arguments with contradictory viewpoints. For instance, "those who consider knowledge as a complex and evolving construct make more elaborate and stronger arguments than those who view knowledge as being fixed" (Ku et al., 2014). In educational situations, those students having evaluative epistemological beliefs (i.e., seeing knowledge as evidence-based) produce higher quality arguments; they are more competent in constructing, refuting, and supporting arguments than their counterparts who hold simpler epistemic views (Mason & Scirica, 2006). The teaching of argumentation by the science teachers is closely tied to their epistemological beliefs. These with more sophisticated thoughts about science being constructivist nature tend to support high-quality argumentation practices in the classroom (Şengül et al., 2020).

Research on both epistemological beliefs and critical thinking has shown that these beliefs have a significant influence on the ability of individuals to carry out critical thinking-related tasks. People who understand knowledge as being certain, or unchanging or absolute, tend to perform more poorly when faced with conflicting arguments (Chan et al., 2011). Students who perceive knowledge as provisional and open to change usually engage in more extensive information processing by using critical thinking to evaluate and verify information. In contrast, students who rely on authority figures for validation exhibit a more superficial interaction with knowledge, showing a relationship between epistemological beliefs and depth of cognitive processing (Hyytinen et al., 2014). Epistemological beliefs of knowledge structure and malleability are found to be positively related to critical thinking and academic achievement because these beliefs promote deep learning strategies, which, in turn, encourage students to critically analyze the material (Amiri, 2018). Instructional methods that coach students to think critically can also foster students' epistemological beliefs by encouraging students to question knowledge sources (Valanides & Angeli, 2005). Together, critical thinking intervention has the potential to help students recognize and avoid the use of epistemologically unwarranted beliefs, such as pseudoscientific beliefs. Intervention in these areas indicates that critical thinking is closely tied to knowledge validity beliefs (Dyer & Hall, 2018).

While the literature shows that there is a strong relationship between these variables, there is no study focusing on critical thinking and epistomological development in the argumentation process in online education.

Importance of Research

An examination of how well these different online learning environments are viewed, using the Toulmin argumentation model, provides some perspective on the way of developing argumentation and critical thinking skills in these environments. It focuses on the development of critical thinking skills in students, which is a fundamental aspect of educational pedagogy. Understanding how online learning affects these skills will make important contributions to the field of education, especially in science and technology courses. The research investigates the relationship between students' epistemological beliefs about the internet and their critical thinking skills. This is very important in an age where the internet is the primary source of information and it is crucial to understand how beliefs about the nature and reliability of online information affect learning outcomes. The information might help instructors and curriculum developers understand the main elements that one should keep an eye on while laying strategies for effective online education, particularly development of thinking and argumentation abilities. The study carries far-reaching implications for educational practice and policy in a large number of ways. For instance, it seeks to develop integration technology vis-a-vis education and understand the position of learners' beliefs with learning.

Aim

The aim of this study is to evaluate the effect of the Toulmin argumentation model on students' critical thinking skills and epistemological beliefs about internet-based information within an online educational context, as well as to examine the relationship between these constructs in a structured argumentation setting. Sub aims are;

To assess the impact of the Toulmin argumentation model on students' critical thinking skills within an online learning environment

To explore changes in students' epistemological beliefs about the reliability and structure of internet-based information following exposure to Toulmin-based argumentation activities

To examine the relationship between critical thinking skills and epistemological beliefs in the context of Toulmin argumentation in online education.

Method

This research was conducted using quantitative research method. "Quantitative research uses inquiry strategies such as experiments and questionnaires and collects data with

predetermined instruments that provide statistical data" (Creswell, 2003). The research was conducted online with the quasi-experimental design method. Quasi-experimental design method is a research model used in experimental research. In this method, experimental and control groups are formed and cause-effect relationships between variables are examined. Quasi-experimental design is used when subjects are not randomly assigned (Çetinkaya, 2018). This design is a type of experimental design and allows observations to be made under the control of the researcher in determining cause-effect relationships (Baş & Beyhan, 2017). Quasi-experimental designs have similar characteristics to experimental designs and are preferred when the selection of subjects is not neutral (Gündüzalp, 2021). This design is used when the experimental and control groups cannot be randomly selected (Soytürk & Şahin, 2016). It is stated that quasi-experimental designs are more preferred than experimental designs (Gündüzalp & Göktaş, 2022).

Research Process

The research was conducted in the second semester of the 2020-2021 academic year. The data were collected during one hour of each science and technology lesson (one hour of each week was devoted to space and beyond and one hour to other current topics in science and technology). During the 10-week research process, the popular physics concepts (space and beyond) web page previously developed by the first author was used for all students (http://www.biyolojiegitim.yyu.edu.tr/kf/sg/sg.html). Students participated in the lessons by remote access (Google Meet) from their homes or suitable environments and the topics were covered. In addition, students who could not participate in the lessons had the opportunity to participate later. In general, the experimental and control group students used this web page throughout the research and made evaluations on the concepts of space and beyond with their lecturers. In addition to this, simple discussions were made in the experimental group based on the Toulmin argumentation model. These discussions were based on online and voluntary participation.

Table 1 shows the course programme used in the research. In this syllabus applied to all participants, the only difference applied to the experimental and control groups were the Toulmin argumentation model.

Table 1

Course programme applied in the study

Weeks	Transaction	Description
1	Pre-test	The tests used for the research were administered online.
2	Start-Informing	Both groups were informed in detail about the application and the research.
3	World	Experiment: Introduction to Toulmin argumentation model, examples, applications (2 lesson hours)
4	Stars	Control No activity related to the application was carried out this week.
5	Planets	All concept videos about the world were watched and comments were made on them. It was continued according to the questions from the participants.
6	Constellations	All concept videos about stars were watched and comments were made on them. General characteristics of stars, birth, life and death were emphasized.
7	Nebulae	All concept videos about planets were watched and comments were made on them. Detected planets, criteria for being a planet, current studies, and planetary characteristics were discussed.
8	Moon-Satellites	All concept videos about constellations were watched and comments were made on them. The relationship between constellations and people's naming with imaginary drawings, lonely stars and groups, life in star clusters were discussed.
9	Evaluation-Interpretation	During 8 weeks, the topics learnt were repeated and discussed through the questions from the participants and the points that were not understood.
10	Post test	The tests used for the research were applied online.

Note: Each week, at least one activity related to the subject according to the Toulmin argumentation model and at most a few activities depending on the participant's request are carried out in the experimental group.

Toulmin argumentation model was applied in the weekly online sessions of the experimental group. In each session, one of the components of the Toulmin model, such as claim, data, justification, qualifier and rebuttal, was introduced and students' argumentation skills were gradually developed. For example, students in a planetary science lesson were prompted to make claims about the habitability of selected planets based on the data given. Then, students were encouraged to justify their claims with scientific facts (reasons) and raise possible counterarguments (rebuttals). Such activities aimed to contribute to critical thinking through structured argumentation by allowing students to present their views but at the same time develop some critical considerations addressing opposing views. This had the dual focus of giving students structure for debate, with opportunities to see their views contrasted by critiques. Students were required to submit their independently written arguments and also participate in discussions among the teams so that all could participate. However, being an online course, challenges, such as varied student engagement, time constraints and limitations of virtual discussion, could probably have hampered the intended effectiveness of the model. Although the Toulmin model describes a learning situation that is interactive and discussion-based, the online format limited the depth of discussion by which face-to-face sessions often afford higher quality argumentation.

Sample

The sample of the study consists of students studying in the Child Development Programme at a state university. The students participating in the study voluntarily participated in the process. Student groups (branches) were randomly divided into

experimental and control groups. A total of 68 students participated in the study. It was determined that these students were from eastern and southeastern Anatolian provinces. It was determined that the age range of the participants was between 19-25 years and they were predominantly in their 20s. In addition, it can be said that all of the participants have internet access and use it actively even if they have limited opportunities. It is assumed that the participants were objective in their online participation and data collection. As a matter of fact, the grades obtained in the research were not used as midterm or final grades.Those who took voluntary part in the tests were declared to get full grades. But it must be said that all participants did achieve full marks.

The participant attendance and participation were recorded using Google Meet logs and attendance diaries. Overall, the students attended the sessions regularly and most participated in the weekly discussions. On the other hand, there was variation in attendance since among some students there was little or no contribution, and they mainly observed the discussions.

Data Collection Tools

Critical Thinking Skill

In determining the critical thinking skills of the participants, the scale was used with permission from Eğmir and Ocak's (2016) study "Developing an Achievement Test for Measuring Critical Thinking Skills". The KR-20 and KR-21 values of the multiple-choice test consisting of 25 items were found to be 0.61 and 0.63, respectively. In addition, the item difficulty index for the overall test was 0.37 (moderately easy) and the item discrimination index was 0.32 (very good item).

Epistemological Belief Scale

In this study, a scale was used to examine not only the impact of the Toulmin Model on critical thinking but also how it shapes students' epistemological beliefs towards online information. It is thought that interacting with information in an online environment, even in an academic context, contributes to students' critical thinking towards information on the internet. In this context, students' epistemological beliefs about the Internet were assessed in order to support their digital literacy skills. In determining the participants' epistemological beliefs towards the Internet, the scale from Kılıç-Çakmak, et al. (2015)'s "Adaptation of the Epistemological Belief Scale towards the Internet" was used with permission. The $\chi^2(463)= 316.77$, (sd=101, p.=.0000); $\chi^2/sd= 3.14$; RMSEA=.068, SRMR=.043, GFI=.92, AGFI=.89, IFI=.98, CFI=.98, NFI=.98 and NNFI=.98 values of this scale show its validity and Cronbach's Alpha coefficient (.81) shows its reliability.

Analyzing the Data

The scales used in online data collection were created with "Google forms" as pre-posttest. The collected data were transferred to Microsoft Excel and analyzed with the

help of SPSS 22. Frequency, mean and independent sample t-test were used in the analyses.

Ethical Considerations

In this study, points were offered for participation in Toulmin argumentation activities in order to encourage student engagement in the online format. Recognising potential ethical concerns, this practice was carefully considered in light of both educational and ethical standards. Participation grades were designed to encourage participation without tying students' academic achievement solely to these activities. Thus, full points were logged for participation rather than for quality or correctness of answers. The aim here was to create inclusivity whereby every student felt encouraged to actively engage in learning. On an ethical note, in an online context, the question of how appropriate it is to grade solely based on the notions of participation, openness, and fair academic conduct arises especially in the circumstance whereby the idea of participation-based grading competes with notions of educational values. Here, the strategy had to tackle the problem of participation in varied challenges that students might have keenly felt: that the online interface was literally disconnected. The grades reflected tangible motivation to cone members into subsequent participations, allowing practice rather than assessment as the basis of competition that let students sharpen argumentation skills. The ethical integrity had always remained intact in that students were told that participation grades would not be considered part of summative assessment but formative feedback to encourage their participation. Such practice aligns with the strategies of pedagogy designed to cultivate a conducive learning climate in keeping with current research on active learning and student motivation in online contexts (Dweck, 2017; Ryan & Deci, 2000).

Results

The findings obtained within the scope of the research are presented below.

Effect of Toulmin Argumentation on Critical Thinking Skills
Table 2

Findings related to critical thinking skills

Tests	Groups	N	N Mean	Standard Deviation	Standard Error	t	p
Pre-test	Experiment	31	15,097	4,053	,728	-0,208	0,836
	Control	37	15,270	2,815	,463		
Posttest	Experiment	32	14,406	4,362	,771	1,063	0,292
	Control	34	13,412	3,183	,546		

In Table 2, it was tested whether there was a statistically significant difference between the mean scores of the two groups before and after the application. In both tests,

t values and p values (-0,208 and 0,836 for the pre-test, 1,063 and 0,292 for the post-test, respectively) show that there is no statistically significant difference between the groups ($p < 0,05$). Based on the above findings, it came to be concluded that no significant difference existed in the critical thinking skills level between the experimental and control groups. Both these groups had similar levels of critical thinking skills, and there were no significant changes of such skills during the course of the research.

Effect of Toulmin Argumentation on Epistemological Beliefs

Table 3

Findings related to epistemological beliefs

Tests	Groups	N	Mean	Standard Deviation	Standard Error	t	p
Pre-test	Experiment	32	3,703	,426	,075	-1,52	0,133
	Control	36	3,889	,564	,094		
Posttest	Experiment	32	3,733	,536	,095	-1,878	0,065
	Control	34	3,966	,471	,081		

Table 3 shows that there is no statistically significant difference between the sample groups before and after the application in terms of epistemological beliefs. When the p values of the differences between both groups are analyzed, it is seen that these differences are not statistically significant ($p > 0,05$). However, the p value in the posttest (0,065) is lower than in the pretest, which may indicate that there may be a certain effect, but this effect is still not statistically significant. This indicates that education has no significant effect on epistemological beliefs.

Correlation between Critical Thinking Skills and Epistemological Beliefs

Table 4

Correlation between epistemological beliefs and critical thinking skills scores

		Epistemological belief	Critical thinking
Epistemological beliefs	Pearson Correlation	1	,050
	Sig. (2-tailed)		,693
	N	66	66
Critical thinking	Pearson Correlation	,050	1
	Sig. (2-tailed)	,693	
	N	66	66

Table 4 analyses the correlation (relationship) between epistemological belief and critical thinking skills scores with Pearson Correlation Coefficient. The correlation coefficient between epistemological belief and critical thinking skills is 0,050. This value indicates that there is a very weak relationship between the two variables. The p value testing the significance of the correlation between the two variables is 0,693 ($p > 0,05$). It is concluded that the relationship between epistemological belief and critical thinking

skills is not statistically significant. It shows that there is a statistically insignificant and very weak relationship between epistemological belief and critical thinking skills.

Discussion

Most of the studies on the impact of critical thinking and epistemological beliefs would consider traditional education environments, and at the same time, few studies have had their focus on the impact of argumentation models-like the Toulmin framework- on these competence skills in online educational contexts. In particular, structured argumentation has lacked research that examines whether it will improve critical thinking or affect beliefs about DSIL in virtual learning environments. The present study investigated the extent to which Toulmin's argumentation approach could influence students' critical thinking abilities and beliefs. Reflecting on the data gathered, the following major findings arose. The structured approach to argue using Toulmin did not significantly improve critical thinking skills between the experimental and control groups. Secondly, the only little change happens with epistemological beliefs, and again, the change is not significant. Correlation analysis between critical thinking and epistemological belief indicated only a weak and statistically insignificant correlation, thus lending support to the findings.

This research presents a clearer picture of the Toulmin mechanics of argumentation in the context of online learning and instruction. While other models have worked on the promotion of critical thinking within face-to-face interactive settings (Sampson & Blanchard, 2012; Erduran et al., 2015), our study found no significant improvements in critical thinking skills in online experimental groups when compared to their control counterparts. This result contradicts several studies showing the effectiveness of structured argumentation to increase cognitive engagement in traditional classroom settings (Gülen, 2019; Lytzerinou & Iordanou, 2020). (Telli & Altun, 2020) emphasised that critical thinking is closely linked to active, face-to-face interaction and that this interaction may be difficult to replicate in online environments where students may experience apathy and low motivation.

The limited effect of the Toulmin model on epistemological beliefs in our study is contrary to findings from previous studies in the literature. Prior studies indicate that, through critical engagement and argumentation, epistemological beliefs that knowledge is complex and evolving can develop sophistication (Ku et al., 2014; Mason & Scirica, 2006). However, the digital format may prevent students from fully engaging in this reflective process. Kılıç-Çakmak et al. (2015) and Yılmaz (2016) emphasised that continuous and interactive interventions are often required to meaningfully change deeply rooted epistemological beliefs about online knowledge. The implication here is that though the Toulmin model theoretically has the capacity for critical engagement, its possible impact on students, from the viewpoint of effecting a change in beliefs regarding internet-based knowledge, is relatively lower when face-to-face dynamics are absent.

A low relationship between critical thinking skills and epistemological beliefs in this study is actually in contrast to most studies in traditional settings, where these constructs have generally been more interrelated (Chan et al., 2011; Hyytinen et al., 2014). In-person scenarios allow individuals who see knowledge as a constructed, ever-evolving phenomenon to engage more fully in critical thinking and analytical discourse (Nussbaum & Bendixen, 2003; Bromme et al., 2010). The online setting disrupts the synergistic relationship between epistemological understanding and critical engagement, which may explain why these constructs did not correlate strongly in either study. It is possible that the digital platform did not foster the social and cognitive presence needed for students to reflect on both their critical thinking skills and epistemological beliefs simultaneously, an element that face-to-face environments facilitate more organically (Telenius et al., 2020). The study concurs with the findings of Özdemir and Yalın (2007), who stated that asynchronous online learning environments are a hindrance to students in the development of collaborative and critical thinking skills as well. The online activities based on the Toulmin model in this study, although well-structured, lacked the features of spontaneity and that immediate feedback associated with face-to-face interaction, which explains the limited critical engagement seen. The findings also suggest that the very digital nature of the intervention may have asked for a compromise between the goals of supporting students' argumentation skills and reflective beliefs from their perspective because the probability of their active participation was, indeed, limited during the asynchronous discussions. These findings are also in line with those of Widodo et al. (2023), who state that face-to-face argumentation is more effective than online formats in supporting higher-order higher-order reasoning and thinking.

The findings of the study show that the Toulmin Model can be effective not only on critical thinking skills but also on epistemological beliefs towards information on the internet. In this study, which was conducted in an academic environment, students' level of confidence in knowledge can improve their critical approaches towards the information presented online. In this context, further research on how the Toulmin Model can be used to improve students' critical thinking skills when accessing information on the Internet is recommended.

The lack of significant differences in critical thinking skills and epistemological beliefs between the experimental and control groups may reflect the inherent difficulties in implementing the Toulmin model in a virtual format. Nevertheless, the emphasis on the strategy in the traditional classroom was very dynamic argumentation and responsive towards critical thinking. On the other hand, online may undermine their true potential when students do not attend or participate repeatedly. This finding suggests that the online implementation of the Toulmin model might benefit from additional strategies such as smaller breakout discussions, interactive polling, or real-time feedback to create a closer approximation of face-to-face learning. This indicates that the Toulmin model creates many complexities in online application in consideration of the need for

critical thinking aura and belief as opposed to just applying the simple model. Though the model has appealing ramifications at a theoretical level, it highlights that such digital well-being may just simply call for some additional encouragement methods in order for participation and interactivity to occur; these being paramount in critical thinking development. Future research could tackle this by developing an alternative hybrid model involving both online and face-to-face sessions, with some added interactive tools.

Conclusions

This study sought to examine the effectiveness of the Toulmin argumentation model in developing critical thinking skills as well as influencing epistemological beliefs. Importantly, the finding showed that although the model was kept structured, the implementation in an online format did not significantly influence students' critical thinking skills and beliefs concerning the reliability and nature of online information.

The study seems to show that, in the online environment, Toulmin's argumentation model lacks the depth of interaction and reflection that could help achieve significant change in critical thinking and epistemological development. Good for face-to-face argumentation and reflective dialogue, its presence in the virtual environment may not realize the full preparation of what it strives to accomplish. Empirical research in very recent years suggests that this reality calls for further investigation into how online educational contexts can be improved to support cognitive and epistemological development through structured argumentation.

Our findings thus suggest that educators ought to consider multimodal or hybrid strategies, such as those that intermix Toulmin-based argumentation with increased interactivity and reflection, in order to promote critical thinking and epistemological beliefs more effectively in online contexts. As education enters the digital and hybrid age, the best way to optimise such frameworks will be important to prepare students to deal with and critically navigate digital information.

Limitations

Several limitations may have influenced research results. First, the sample size was relatively small and geographically limited, which may have affected the generalisability of our findings. Second, online participation varied across students and the absence of face-to-face prompts may have limited participation. The online format of the study potentially limited the depth of argumentation and critical engagement that Toulmin's model can facilitate in a physical classroom setting.

Recommendations and Future Directions

Longer-term interventions with different and larger samples could investigate how argumentation models influence critical thinking in online education. Mixed methods research involving qualitative assessments of student engagement and perception may also provide more detailed information on how students interact with and engage with

argumentation frameworks. In the case of exploring online alternatives or modifications in the implementation of the Toulmin model, still, strategies will burgeon through the development of epistemological beliefs and critical thinking development. This can raise ethical issues in certain contexts, for grading participation in this study may possibly be seen as undermining fairness of assessment. Other ways of encouraging participation in an online environment without grading for participation could be further investigated.

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Enhancing physics learning through feedback: insights from secondary and high school teachers

Gabriela DOMILESCU•, Mihaela IORGA••

Abstract

Numerous studies in the educational field show the importance of feedback in the teaching process and students' motivation for learning. Although researchers agree that feedback is essential for improved performance, learners often dismiss it, and its effectiveness is diminished because of specific characteristics of feedback itself, teacher, and learner. By employing a non-experimental transversal research design, the present study aimed to assess the implications of feedback on the achievement of middle and high school students, as perceived by the teachers, in the subject of physics. To this end, we first conducted a narrative review of the existing literature with a focus on the types of feedback, the ways of giving it, and its effectiveness, and a qualitative analysis of how feedback is implemented in the classroom and its implications for student achievement, we created an evidence-based interview grid. Afterward, we realized and gathered valuable information from 11 Romanian secondary and high school teachers. According to the results, feedback improves student achievement and can streamline teaching to meet the student's needs and channel them toward improved performance. Our paper tries to fill the gap between the existing knowledge about feedback and the actual process of teaching and learning Physics in secondary and highschool. Even if our endeavour has limitations (e.g., a small number of interview participants), it provides a clearer picture of how to make the most of the feedback according to teachers. The main contribution of this paper is identifying physics teachers' perceptions of feedback and suggesting improvement proposals, by analysing current research. Also, our work offers some straightforward avenues for using feedback in physics disciplines in the Romanian context. We also advanced concrete proposals for optimizing the feedback offered to secondary and high school students in the physical discipline to help them optimize their performance.

Keywords: feedback, teaching physics, secondary school, high-school, interviews.

• PhD, Lecturer, Teacher Training Department, West University of Timisoara, gabriela.domilescu@e-uvt.ro

•• Teacher, Secondary School No. 24 Timisoara, Romania, mihaela.iorga@e-uvt.ro

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1. Introduction

Continuous feedback is a cornerstone of modern educational systems that prioritize student-centred learning. Research by Shute (2008), Lipnevich and Smith (2009), and Boud and Molloy (2013) underscores the vital role feedback plays in improving the learning process and boosting student motivation. Although feedback is essential for motivation and improved academic performance, learners often dismiss it and its effectiveness is diminished depending on specific characteristic of feedback itself, teacher, learner. Nevertheless, the literature on feedback is relatively scarce, especially in Physics.

Feedback is a fundamental element in numerous learning and instructional theories. Understanding the conditions that make feedback effective can enhance both theoretical advancements and practical teaching methods (Bangert-Drowns et al., 1991). Although, researchers (Shute, 2008) agree that feedback is an important facilitator of learning and performance, it is very important for teachers to be fully aware that feedback becomes effective only if it is provided correctly and only if it fills the gap between the current results and desired performance (Sadler, 2014).

The aim of this paper is to analyze the specificity of feedback in Physics and to offer recommendations to improve feedback effectiveness and practices in secondary and high school. So, this article is targeted at Physics and/or science teachers interested in improving their feedback practices, as well as at academics working in teacher training. Despite numerous research on feedback, to our knowledge, in the Romanian educational area there are no studies that analyse the impact of feedback in teaching Physics in secondary and high school and, even less, that addresses the optimization of feedback practices in teaching Physics. Another reason why optimizing feedback becomes relevant for teaching Physics in secondary and high school is that, lately, there is a significant shortage of Physics teachers in Romania and students 'interest for this area is decreasing.

First, we discuss the importance of feedback, then, we continue by reviewing the existing literature to understand the specificity and challenges around feedback, generally, and in science (Physics), especially. The specificity of feedback may be affected by several contextual characteristics (e.g., gender, teaching experience, taught subject), this being the reason why we wanted to have the practitioners` perspective. After analyzing the physics teachers 'answers to our question regarding feedback practices in secondary and high school Romanian education, we conclude by suggesting some directions for improving feedback effectiveness in teaching Psysics.

Literature Review

Even if there is not a widely agreed scholarly definition of feedback, the general understanding is that feedback is something that teachers give to students in order to help them understand the subject and progress academically. In the educational context, feedback refers to the information given to students about their performance or

understanding of a specific task or concept. If at his early days, the term feedback was perceived as something "given" after the performance of the pupil/student, its significance has evolved acquiring the meaning of a process in which the pupils play an active role. This evolution of feedback from a simple term to a concept allowed the emphasis on as many characteristics of feedback as possible (Dawson et al., 2019). Thus, while the term feedback meant originally providing *hopefully useful* comments from the teacher to students, later feedback was found to serve a variety of purposes such as: marking achievement, developing comprehension and skills, motivating students.

More recently, definitions of feedback emphasise the importance of student agency in relation to teachers input, the perspective of the student, the understanding of how students learn in order to see how teachers should best teach (Scott, 2014). The most important functions of feedback are (Molin et. all, 2020) helping students reach their learning objectives (by pointing out their strengths and recommending areas for development), sharing learning intentions, clarifying success criteria, providing feedback that helps learners progress, and actively engaging and empowering students. Moreover, the student learns much faster and more effectively when he has a clear idea of how well he is learning and what he might need to do to improve (Mag, 2019).

Nowadays, we speak about different types of feedback: written feedback, oral or conversational exchanges, grades, assessment comments, and online feedback. Hattie and Timperley (2007) provide a conceptual analysis of feedback and explore the evidence concerning its impact on learning. They conclude that while feedback is a significant factor in the teaching and learning process, its effectiveness depends on various factors, such as the type of feedback (whether positive or negative) and how it is delivered, including considerations like timing. Farquhar and Regian (1994) found that when immediate feedback is provided, elaborative feedback leads to higher accuracy compared to corrective feedback. Black and Harrison (2000) highlight key features of effective feedback, concluding that it should stimulate thinking by encouraging learners to discuss their thoughts with a teacher or peer to drive improvement. Effective feedback should prompt immediate action, connect to the success criteria, and enable learners to compare their assessment of quality with that of the teacher or peer. Additionally, it may guide learners on where to seek help and how they can enhance their work. Good feedback should incorporate several dimensions to be perceived as good: Dunworth and Sanchez (2016) state that quality feedback is a process in which teachers' inputs and support are productively used by students to improve their educational experience from several different dimensions (affective or interpersonal, orientational and transformational).

Hattie and Timperley describe feedback as information given by an agent—such as a teacher, peer, book, parent, self, or experience—that offers insights into student's knowledge. Effective feedback strongly influences assessment, but also learning and teaching. From the perspective of students, researchers (Scott, 2014) define feedback as how students can always be aware about their level in terms of the knowledge, skills and understanding in a subject.

Several studies (Ackerman & Gross, 2010, Hattie, & Timperley, 2007, Mulliner, & Tucker, 2017) demonstrate that feedback is a crucial element of the teaching-learning process, consisting of two key components: the receiver and the transmitter. To offer effective feedback, teachers have to make appropriate judgments about when and how to provide quality feedback. Feedback is a means through which the students are offered the tools that will allow the understanding of all aspects related to the learning process.

Nevertheless, research shows that learners often dismiss feedback, even if it has a strong unique influence on improving student results. Why is this happening? Possible answers relate to:

- according to Mulliner and Tucker (2017), the frequency, timing, and method of providing feedback are more important than the quality of feedback itself in supporting student learning.
- teachers provide feedback to students on the strengths and weaknesses of their work, which can often be complex and difficult for students to fully understand (Juwah et al., 2004).
- for feedback to be effective, it is crucial for the teacher to have a deep understanding of their students, including their current level of performance and where they need to progress. This knowledge allows teachers to provide targeted support to help students reach their desired level: a number of studies have shown that elaborate feedback, where students are helped to find the correct path, is much more effective than situations where they are simply told whether they are right or wrong. (Blair, & McGinty, 2013; Nicol, 2011);
- many studies indicate that the effectiveness of feedback is largely determined by the provider, who must carefully consider the content, tone, and timing to ensure the feedback process is successful (Ketonen, Nieminen, & Hähkiöniemi, 2020).

Analyzing the effectiveness of feedback in science, researchers argue the importance of a social context in constructing meanins and developing understanding in science learning (Duit & Treagust, 2008) and that much of the meaning-making occurs through classroom discussion during teacher-student interaction (Chin, 2006). Studying science teachers instructing 11–18-year-olds in science, Gioka (2006) concluded that feedback plays a formative role only when it offers information that helps bridge the gap between current performance and desired outcomes. Additionally, for feedback to be effective, teachers must provide students with time to respond to the comments given and with a comparison of their performance relative to the proposed educational objectives, with the goal of helping them reach and even exceed those objectives.

Research (Ives, 2000; Capistrano, 2002, as cited in Alcantara & Roleda, 2016) indicates that class size in Physics significantly impacts the teaching and learning process, particularly affecting the quality and timeliness of feedback. Larger class sizes make it more challenging for teachers to provide effective and timely feedback to students. Class size is a significant challenge for teachers when providing feedback. In the context of science practical work, it is unlikely that activities can be conducted both effectively and safely in classes with more than 25 students (Rennie, Goodrum, & Hackling, 2001).

Alcantara and Roleda (2016), in their analysis of fast feedback methods in teaching physics, emphasize the critical importance of teachers monitoring students' learning and providing immediate feedback. They argue that promptly informing students of their mistakes helps them learn and take corrective actions, while knowing they are performing well gives them a sense of achievement, which motivates further learning.

For teachers to offer quality feedback, it is important to believe in its usefulness and contribution to student's outcomes and to make changes in assessment practices, which come hand in hand with shifts in teachers' beliefs and approaches. There is research showing important aspects of feedback that may need to be approaches to improve students' performances in an interactive and non-judgmental manner (Pusdekar, Y., et. al., 2024) because teachers may be unaware of how to give constructive and specific feedback to the student and may unintentionally provide feedback about a students' performances through nonverbal or verbal communication. Research suggests that neutral feedback offers several advantages in fostering conceptual understanding. To create a more effective inquiry-based atmosphere in a science class, it is recommended to avoid praise such as *good boy, great answer, or well done* (Goodrum, 2004 in Siddiquee & Ikeda, 2013).

Methodology:

To ensure a comprehensive and relevant theoretical framework, we used a non-experimental transversal research design, combining literature analysis with semi-structured interviews. First, we analyzed several studies regarding the value of feedback in general (Hattie & Timperley, 2007, Dawson et. all, 2019, Black & Harrison, 2000, Cavalcanti et. all, 2020, Ketonen, Nieminen, & Hähkiöniemi, 2020, Panadero, Lipnevich, 2022) and relevant studies regarding feedback on Physics in secondary and high school (Tripon, 2024, Black, & Harrison, 2000, Mag, 2019), but here the literature is not so rich. Second, we used interview-based research, wherein the teacher-researcher conducted an undertaking to analyse an actual important aspect of the subject the teacher teaches: Physics. The participants of this study are 11 Romanian secondary and high school teachers (73% female, 27% male), who answered the questions of a a predetermined interview guide. We correlated the analysis of literature on feedback with practical reflections from physics classes, through a semi-structured interview because of its flexibility and the possibility of in-depth exploring participants' responses. To identify the answers to these questions, we created a semi-structured interview grid in which we investigated: assessment methods, the role of feedback, the purpose of feedback, the frequency of feedback, students' interest in feedback, levels of providing feedback in teaching Physics in secondary and high school. This approach was chosen to offer a realistic perspective by examining actual classroom practices, allowing for a detailed understanding of Physics teachers' views on feedback. Teachers voluntarily participated in the study after being thoroughly informed about its objectives and procedures.

Informed consent forms ensured that participants were aware of their rights, confidentiality measures, and the voluntary nature of their involvement.

Consequently, our research questions were:

Q1. What are the implications of feedback on student achievement in Physics?

Q2. What is the role of feedback in teaching Physics?

Q3. What are the ways of improving feedback in Physics?

Findings

Analysing the answers teachers gave to our question, we will discuss below the most important implications for the objectives of our paper:

- all interviewed teachers mostly use traditional assessment methods (oral and written). In addition more then half also mentioned using other methods, such as: Homework, Experimental investigation, Projects, Portfolios. The most common types of assessment are: initial, formative and summative assessment.
- most teachers consider feedback as representing an appreciation, collaboration and a way of obtaining information about the effects of an action;
- teachers see feedback as very important, even essential in the educational activity, its purposes being to check how students understood the concepts and to improve teaching; moreover, feedback in education is perceived as *an adaptation tool*, its role being to enhance motivation, self-regulation and self-evaluation;
- regarding the difficulties in the case of feedback in the Physics, most teachers believe that, although feedback requires additional effort and time, offering it is simpler compared to other subjects.
- regarding the frequency of feedback in Physics, teachers offer it very often correlating it with initial, formative and summative assessments, but also whenever it is needed/ after each task. However, there were teachers who believe that feedback offered is not enough: the frequency of giving feedback is quite low because teachers do not give enough time for and do not consider it important.
- when asked to enumerate 4 essential reasons for offering feedback, teachers mentioned: to justify the grade; to help students better understand the level they are at; to improve learners` skills; to be able to self-regulate in the future activity. In an attempt to rank these reasons, we saw that each teacher considers feedback as essential for something specific. Nevertheless, most teachers believe that the role of feedback is not to justify the grade, but to help learner self-regulation and performances.
- regarding the frequency with which physics teachers discuss with their colleagues about feedback and its usefulness, teachers claim that they frequently discuss this aspect,"*whenever we have the opportunity",* but addressing feedback in intercollegiate discussions is not a planned and permanent practice. Most of the discussions take place with colleagues who are part of the same curricular area, and especially during methodical meetings.
- when discussing the role of feedback in motivating students, teachers emphasize that feedback is crucial for encouraging and inspiring students throughout the learning process.
- when asked about how they approach feedback, most of teachers stated that they have a differentiated approach depending on the specifics and particularities of the class and of

students: ("*I approach feedback differently depending on the characteristics and personality of students"*; "*Each class is different and requires a different approach"*; "*Each class has its specifics; … depending on the class level, even depending on the student*; "*the classes have their own specificity; ….the feedback is different"*). Few of the teachers approach feedback is the same way regardless of the situation.

- 90% of teachers believe that students are interested in the feedback received, only one teacher pecified that, generally, students are disinterested.

- to the question related to how feedback can contribute to improving student's performances in Physics, teachers consider feedback having an essential role in improving academical results by: "*enhancing students' ability to recognize correlations between observed physical phenomena and processes, increases self-esteem*", "*optimizes self-regulation*", "*enhances correct self-assessment*", "*encourages students to surpass their current level of knowledge and understanding*". However, one teacher claims that feedback is only effective for students interested in obtaining good results (grades).

- there are four levels of feedback messages that focus on different aspects of students' learning: task, process, self-regulation, and self (Hattie and Timperley, 2007). When asked which of the 4 levels they address when giving feedback, most teachers stated that they are on the first level (the workload and results), followed by the second level (the learning process). Self-regulation is not often aproached, and only one of the teachers considers to offer feedback on all four levels, including the level of the self.

At the end of the interview, teachers participating in the study were asked to specify what worked/didn't work when offering feedback and to give examples of good practices. Analyzing their answers, the following conclusions emerged:

- Feedback produced positive effects when given in oral assessments. There are teachers who claim that the feedback given after summative assessments was effective, although research (Giles, Gilbert, McNeill, 2013) tells us that feedback given after summative assessments is not very effective. Nevertheless, students who were very interested in Physics and in their academic results capitalize on feedback.

- Feedback was effective when used in correlation with alternative assessment methods: Portfolio, Projects and other Independent practical activities. Teachers argue that the effectiveness of this type of feedback is due to its specificity: collaborative, punctual, in real time, complete, making the moment of assessment a learning experience.

- Teachers argue feedback is effective when is given after each assessment and at short time intervals and transmitted through messages of encouragement.

- There were also situations when feedback did not work, especially in the case of online assessments during the pandemic, in certain topics that required more effort from the students to understand certain important aspects (i.e. There were also times when, regardless of the feedback and the support provided, some of the students, did not want to step out of their comfort zone, neither put in a minimum effort). Also, feedback becomes ineffective when it is formulated and given inappropriately, resulting in students misunderstanding ("*It didn't work when it wasn't correctly formulated, when it targeted the person and not the behavior, when it didn't respect autonomy, when it was focused on mistakes*".). Teachers also referred to situations encountered during their teaching careers, specifying, for example, that "*students are totally disinterested in the learning process*" or (in the case of students from rural

areas), "*feedback is not effective because learners do not have the experience to receive and capitalizing on feedback*".

Our findings reveal that Romanian Physics teachers regard feedback as a crucial element of the educational process, promoting learning and development both within and beyond the classroom. Through semi-structured interviews, we collected rich qualitative data that shed light on the significant impact of feedback on student achievement.

Q1. What are the implications of feedback on student achievement in Physics? According to our data, feedback contributes to the improvement of the students' results by highlighting their progress in Physics and it offers students the opportunity to check their results and ask questions, enhance harmony and a continuous teacher-student dialogue, essential for improving academic performances. Studies about feedback and performance show that constructive feedback significantly impacts academic performance, improving understanding and motivation, allowing learners to self-regulate and adjust their approaches to tasks (Hattie & Timperley, 2007; Wisniewski et al., 2020) and that internal motivation and performance are increased by task-focussed comments, not global-affective comments (Koenka et. all, 2021). By receiving feedback on their progress, students become able to self- regulate their learning, become more self-confident, more motivated for future learning activities, more interested in Physics, especially, and in school performance, generally. By taking time to talk with students, giving them feedback, teachers can have a positive impact on the learning process.

Q2. What is the role of feedback in teaching Physics? Feedback not only certifies school performance, but also enhances confidence, motivation and interest. Feedback informs about the level of preparation of students, the acquired knowledge and the developed skills, but it also provides a general and punctual view of learning, facilitating the reorientation of teachers' actions to adapt to student` needs and channel them towards improving their results.

Q3. What are the ways of improving feedback in Physics? Research indicates that feedback can either greatly enhance or hinder learning, playing a crucial role in helping students achieve their goals (Hattie & Timperley, 2007). If feedback is not clearly directed, students may struggle to draw meaningful conclusions about their progress and development during the learning process and students may not know how to use feedback for optimizing their performances. The essential condition of an effective feedback is to be oriented towards the future collaborative, punctual, in real time, complete, usable, sufficiently detailed, comprehensible, and consistent.

Discussion:

In line with well-known research, our data shows that feedback influences students' learning performance, having a particularly important role in improving students results

by providing additional insight into the skills that would induce improved performance. Feedback plays a crucial role in enhancing learning and performance (Bandura & Cervone, 1983), but its impact is significantly greater when it is delivered effectively. In practice, feedback does not have to be limited to delivery of information from the teacher to the student, it has a variety of purposes such as grading, developing students' understanding, skills and motivation. Feedback becomes ineffective when it is formulated and given inappropriately, causing misunderstandings on the part of students.

Although feedback is an important facilitator of learning and performance (Shute, V. J., 2008), the success of feedback depends on how it is delivered to learners: students learn more quickly and effectively when they have a clear understanding of their progress and the actions they need to take for improvement (Mag, 2019). In practice, feedback should not be limited to providing information from the teacher to the student, it has a variety of purposes such as: motivating students, increase involvement, improve self-esteem and self-regulation, optimize teacher-student relationships. Feedback becomes ineffective when it is formulated and given inappropriately, resulting in misunderstanding on the part of students. Thus, the information provided by specialized literature was confirmed (Ackerman, Gross, 2010, Hounsell, D., 2003, apud Mulliner, & Tucker, 2017), according to which feedback is an essential component of the instructional-educational process that involves two elements – the receiver and the transmitter, and the quality of feedback has a strong unique influence on improving student results and achieving school performance. According to literature (Educational Endowment Foundation, 2021) additionally, prompt and constructive feedback encourages active learning, student engagement and motivation. Collaboration between experts and teachers is essential in developing assessment methods and tasks that effectively evaluate science learning and provide meaningful feedback (Rennie, Goodrum, & Hackling, 2001). This iterative approach encourages students to actively engage in their learning, resulting in enhanced comprehension and better retention of information. Effectiveness of feedback depends on the experience and capabilities of the teacher and the students, and the nature of the science tasks undertaken. According to some research, students indicate that quizzes are frequently used to provide feedback and one-third of students report that their teacher never speaks to them about how they are going in science (Rennie, Goodrum, & Hackling, 2001).

Developing feedback literacy among both teachers and students should be a key priority. Sutton (2012) defines feedback literacy as the ability to read, interpret, and effectively utilize written feedback. Carless and Boud (2018) expand on this approach by describing it as the understanding, skills, and attitudes needed to interpret feedback and apply it to improve learning or work strategies. Feedback literacy emphasizes the critical role of students' active involvement in the feedback process. While teachers play a pivotal role in delivering feedback, its true effectiveness depends on the recipient's ability to accept, process, and act on it meaningfully.

Feedback becomes effective only if it is given and understood correctly. Feedback efficiency increases if there is a dialogue and a permanent collaboration between teachers teaching different subjects, but also between teachers and their own students. The way students value feedback is heavily influenced by how the feedback message is delivered. Recent research has increasingly explored how delivery methods influence the feedback process (Winstone et al., 2017; Jonsson & Panadero, 2018; Van der Kleij & Lipnevich, 2020). For example, Hattie has shifted his focus from analyzing feedback characteristics, as described in his model with Timperley, to examining how the presentation of feedback can more effectively help students make use of it (Hattie & Clarke, 2019).

One effective way to enhance feedback while reducing the time spent grading student work and writing detailed comments is using Fast Feedback Methods (van den Berg, 2003). These methods focus on providing meaningful formative assessments without requiring teachers to grade papers outside of class. This can be achieved by utilizing conceptual or problem-solving questions, which students can answer through various formats such as written responses, explanations, simulations, graphs, or sketches.

There is an undeniable need to develop assessment approaches that are both efficient and effective for classroom use. Collaboration between experts and teachers is essential to create assessment techniques and tasks that exemplify the best methods for evaluating science learning and delivering feedback to students (Rennie, Goodrum, & Hackling, 2001). Even if we did not approach it in the interviews, research shows that student-student-feedback is the most effective form, with respect to the direction of feedback (Wisniewski, et all., 2020).

Experts also emphasize that high-quality professional development is crucial for enhancing teachers' ability to teach effectively (Mayer, Mullens, & Moore, 2001), a principle that can also be applied to improving the quality of feedback they provide). Recent studies, including Tripon (2024), highlight the value of feedback not only in teaching Physics but also in service-learning for STEAM students. Feedback sessions enable students to critically evaluate their experiences, pinpoint areas for improvement, and refine their teaching strategies, fostering both personal and professional growth.

Starting from the consideration that feedback is essential for the development of effective learning, we conclude by specifying a few suggestions intended to improve the effectiveness of feedback in physical discipline and not only:

- to raise Physics teachers' awareness of the importance of feedback for
- development of students' skills and motivation;
- to analyse the reasons that lead teachers to invest energy and time in providing feedback;
- to create more collaborative contexts for sharing good practices regarding the use of feedback in sciences;
- to shift feedback from the level of task and results to the level of the learning process and self-regulation, but also of the self, where possible;

- to help students become accustomed to feedback and recognize its value explaining the importance and role of feedback, as well as how to receive and effectively use it;
- to particularize feedback in order to increase students' involvement in the learning process;
- to offer well timed, constructive, encouraging feedback;
- to foster open communication and provide regular, constructive feedback that engages students in the learning process is essential to encourage and create more opportunities for teacher-student interactions and dialogue around assessment and feedback;
- to present feedback in a manner that is comprehensible to students and relevant to their future work;
- to ensure that feedback is thoughtful, reflective, and focused, promoting a deeper understanding of key concepts;
- to utilize technology, multimedia resources, interactive materials, digital assessment when offering feedback;
- to provide each student with the opportunity and support to work on improvements during class, allowing the teacher sufficient time to review this within the lesson.

Limitations

Among the limitations of this study, we mention the following: we approached only secondary and high school teachers form the west and the south-west of Romania, so our findings cannot be extrapolated. This paper reflects the results of a qualitative research on the implications of feedback at Physics from the perspective of teachers, it is not correlated with quantitative data, nor student perspective. Unfortunately, we have identified e few studies regarding feedback in the Physics worldwide, and we have not identified any study in this sense in Romania, so our perspective could be a limited one and with shallow comparative potential.

The following studies could extend the present by quantitative and qualitative analysis regarding the effects and implications of feedback in secondary education. It would also be interesting and valuable to know the opinions of students regarding the feedback and its usefulness. Another aspect worthy of study concerns the correlations between different ways of granting feedback and school results expressed in grades.

Conclusion

The results of our research show that the feedback provided by teachers contributes to student outcomes, can refocus teaching to better meet the students' needs and to channel learning towards the learning outcomes. By correlating the results obtained with recent research, we advanced concrete proposals for optimizing feedback in physics. In our

study, we explore, through qualitative analysis, how feedback influences student growth. After analysing literature in this field and interviewing 11 secondary and high school teachers, we conclude that feedback is regarded as an essential component of student learning, its role being to facilitate learning. Feedback itself has an essential role in the learning process. The teacher' role is also essential in offering proper feedback, but, also, in designing the lessons, knowing and establishing connections with the class. Although feedback is increasingly present in the educational process, it is still necessary for physics teachers to motivate their own students more and help them develop a positive attitude towards feedback and Physics.

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Moderating Effects of Gender on the Relationship between Senior School Physics Students' STEM Self-efficacy and Science Identity

Wasiu Olayinka YAHAYA•, Abdulrasaq Oladimeji AKANBI••, Quadri YAHAYA•••

Abstract

The developmental growth of any society depends greatly on the progression and innovations made by students' in science, technology, engineering and mathematics. The current study determines the moderating effect of gender on the relationship between senior school physics students' STEM self-efficacies and science identity. The study was a co-relational study that employed the use of adopted questionnaires as found in the previous literatures to elicit information on students' STEM self-efficacies like science self-efficacy, engineering/technology self-efficacy, mathematics self-efficacy and students' science identity. The study adopted the usage of structural equation model and collected data were analyzed by SmartPLS software. The findings of the study revealed that physics students' science self-efficacy (β=0.174, p<.05), mathematics self-efficacy (β= -0.296, p<.05) and engineering/technology self-efficacy (β= -0.600, p<.05), and, has negative, positive, weak, substantial and significant relationship with physics students' science identity. The study further revealed that gender as a moderator variable significantly moderated the indirect relationship between physics students' science, technology, engineering and mathematics self-efficacies and their science identity. The study recommended that the physics students should be encouraged to see themselves as science person as this would influence their interest and decision to pursue a future career in science, technology, engineering and mathematics fields.

Keywords: STEM Self-efficacy, Science Identity, Gender, Relationship

• Department of Science Education, Faculty of Education, University of Ilorin, Nigeria
yahaya.wo@unilorin.edu.ng
••Department of Science Education, Faculty of Education, University of Ilorin, Nigeria
akanbi.ao@unilorin.edu.ng
•••Department of Science Education, Faculty of Education, University of Ilorin, Nigeria
badaraeen@gmail.com

Introduction

The learners' ability to identify his/her area of weakness and strength explains the concept of learner's self-efficacy. Beatson et al. (2020) views self-efficacy as confidence in one's ability to succeed in a given task. Self-efficacy as the beliefs and ability to effectively perform tasks needed to attain a valued goal and positive outcomes (Maddux & Kleiman, 2016). Lamb et al. (2014) opined that student substantial self efficacy in STEM education can influence their educational endeavors and aid their career selection. Students STEM self efficacy serves as significant predictor of interests, career aspiration, outcome expectations and persistence among undergraduate in STEM fields (Butz, et al., 2018 & Awaludin, et al., 2023). Quintana and Saatcioglu (2022) asserted that students identifying with science or mathematics in school increase the enrolling odd in a STEM major in college and such student is expected to have a STEM career. Studying students' self-efficacy is important due to its strong association with students' learning outcomes (Bartimote-Aufflick et al., 2016). Hsieh et al. (2007) posited that studying self-efficacy aids students to understand their reason for non or underachievement in an area or field of studying, and dropping out of college as its significantly related to their academic standing. Honieke and Broadbent (2016) opined that student academic self-efficacy moderately correlates with their academic performance. The importance of the studying student academic self-efficacy is not limited to science, technology, engineering and mathematics education alone but extended to medical and humanities education. Filho et al. (2022) asserted that students' self-efficacy in medical education is essential because of its link to student motivation and performance. Mamaril et al. (2016) posited that studying students' self-efficacy is important because it's positively and significantly related to undergraduate engineering students' performance. Science identity remain a complex process been influenced by emotions and recognition that are linked to power, racism, exclusion and inequality (Avraamidou, 2020). Teacher STEM self-efficacy is a significant component of job performance and retention with patterned differences across gender and community of practice (Ofem, et al., 2021; Kelley, et al., 2020; & Menon, et al., 2023). Flowers and Banda (2016) opined that STEM self-efficacy is a critical factor for students to create a science identity and have trust and believe in their ability to engage in the learning and doing of sciences successfully. Aghekyan (2019) carried out a search on development and validation of science identity survey scale. The study adopted the items and construct from previous literatures and exploratory data analysis was used to analyze the collected responses. The exploratory factor analysis (EFA) analysis revealed the seven items were correlated and serves as observed/manifest variables of science identity. Sze et al. (2022) searched on the development of STEM self-efficacy.

Gender is an important factor that can influence learners' decision on science, technology, engineering and mathematics. Cheryan et al. (2017) asserted that masculine cultures contributed to larger gender gap in computer science, engineering and physics than any other areas in science and technology. Cimpian et al. (2020) emphasized that

gender gap of male to female is 4 – 1 ratio in science and technology disciplines like physics, engineering and computer science. Saltiel (2022) attributed the female low math self-efficacy to their likelihood of STEM enrollment dropout rates.

Wang and Degil (2017) attributed the under representations of female students in mathematics intensive STEM fields to cognitive ability, relative cognitive strengths, lifestyle values, field-specific, ability beliefs, occupational interests and gender-related stereotypes and biases. Robnett (2016) submitted that lower STEM self-concept was associated with gender bias in STEM fields. Sun and Bian (2022) attributed three factors that includes cognitive skills, psychological factors, and socio-cultural effects to gender difference in STEM.

Miles and Naumann (2021) carried out a study on mediating role science self-efficacy in the relationship between gender and science identity. A Survey was administered to 964 US first year university students. The study focused on science self-efficacy mediating heterosexual and non-heterosexual students' gender and science identity. The findings of the study revealed that science self-efficacy   mediated the relationship between gender and science identity for heterosexual students but not for non-heterosexual students.

The present study assessed the relationship between senior secondary school physics students' science, engineering/technology, and mathematics self-efficacies and their science identity.
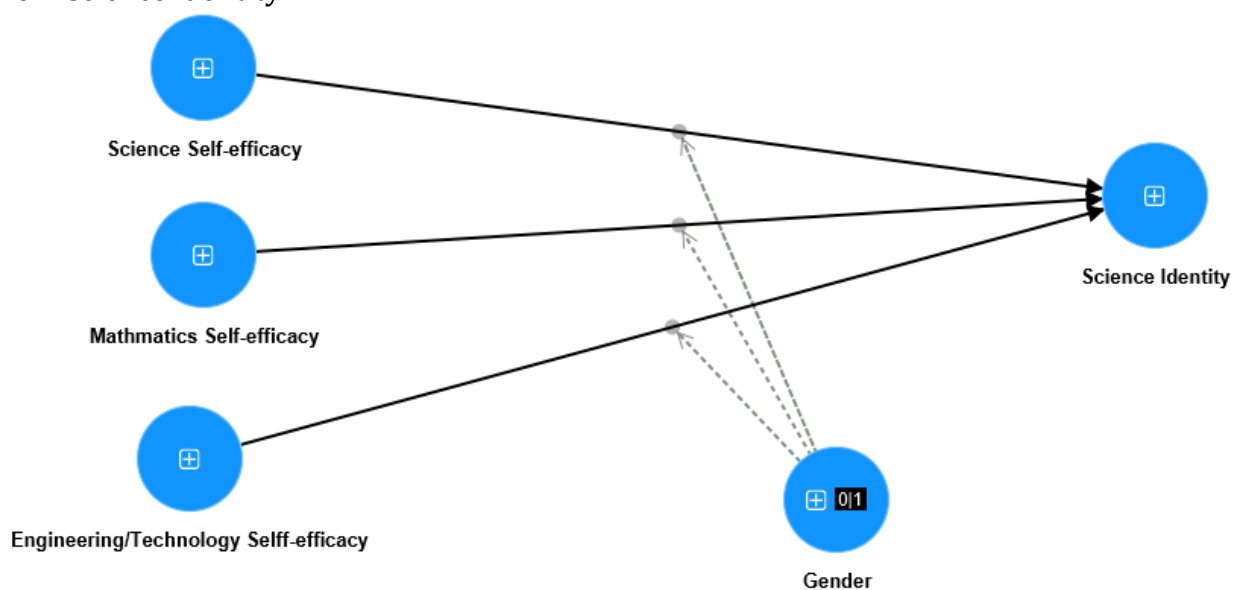
Fig. 1.0: The framework of the STEM Self-efficacies and Physics Students' Science identity.

Literature Review, Development of Research Questions and Formulation of Research Hypotheses

The following previous research outputs were reviewed as related to this present study.

Brown et al. (2016) carried out a study on STEM self-efficacy, interest and perception of middle school students. The study engaged 206 middle school students and Simpson-Troost attitude questionnaire was used to elicit information from the respondents. The

result of the study revealed that there was moderate and significant correlation between STEM self-efficacy and students' intention to persist.

Aalderen-Smeets et al. (2019) carried out a search on STEM ability beliefs as a predictor of secondary school students' STEM self-efficacy beliefs and their STEM field career intention. The study engaged 483 senior secondary school students and multivariate statistical tool (structural equation model) was used to analyze the collected data. The results of the study revealed that positive relationship existed between incremental STEM ability beliefs and also predicted positive STEM self-efficacy beliefs and increased STEM intentions.

Williams and George-Jackson (2014) searched on the extent to which female and male students in STEM field identify as scientists. The study involved 1881 undergraduate result that were collected via online survey. An adopted science identity scale was used as instrument and result of the study shows that 36.5% male and 40.9% female sees themselves as being a scientist.

White et al. (2019) carried out a mixed method search on relationship between racial identity, science identity, science self efficacy and science achievement. The study involves 347 African American college students who attend black colleges and universities. The result of the study revealed that the college science achievement was significantly explained by science identity.

Alhadabi (2021) worked on science interest, utility, self-efficacy and high school students' science achievement. The data utilized in the study were collected from 14,815 high school students and obtained from a large scale database high school longitudinal study of 2009. The results of the study indicated that science self-efficacy has moderate and positive relationship with high school students' science identity.

Research Objectives

1. To determine the physics students' science, technology, engineering and mathematics self-efficacies;
2. To explore the relationship between physics students' science, engineering/technology, mathematics self-efficacies and their science identity;
3. To determine the moderating role of gender on the relationship between physics students' science, engineering/technology, mathematics self-efficacies and their science identity;
4. To determine the effect size of science, mathematics and engineering self-efficacies on students science identity;
5. To determine the variance of proportion of science identity explained by science, technology, engineering and mathematics self-efficacies.

Research Questions

RQ1. What are the senior school physics students' science, mathematics and engineering/technology self-efficacies and science identity?

RQ2. What is the effect size of science, mathematics and engineering/technology self-efficacies on physics students science identity?

RQ3. What variance proportion of the physics students' science identity does science, mathematics and engineering/technology self-efficacies explained?

Second Order Latent Variable	First/Higher Order Latent Variable	Construct's Meaning	Items' Code	Construct's Items	Validity Index	Source
STEM Self-efficacy	Science Self-efficacy	An ability to successful complete a task in science	SCI1	I can succeed with a career in science	>0.75	Items adopted from Sze et al., (2022)
			SCI2	I can perform in science tasks		
			SCI3	I can handle science with ease compared to other subjects		
			SCI4	I can do advanced work in science		
	Mathematics Self-efficacy	An ability to successful complete a task in mathematics	MAT1	I do succeed in math		
			MAT2	I can do advanced work in math	>0.75	

Second Order Latent Variable	First/Higher Order Latent Variable	Construct's Meaning	Items' Code	Construct's Items	Validity Index	Source
STEM Self-efficacy	Mathematics Self-efficacy	An ability to successful complete a task in mathematics	MAT3	I can handle math with ease compared to other subjects	>0.75	Items adopted from Sze et al., (2022)
			MAT4	I am good at math		
			MAT5	I can succeed with a career that uses math		
			MAT6	I can use math to invent useful things		
	Engineering Self-efficacy	An ability to successful complete a task in engineering	ENG1	I am good in creating new stuff	>0.75	Items adopted from Sze et al., (2022)
			ENG2	I am capable in tasks that involves manipulating machines		
			ENG3	I am good in building and fixing things		
			ENG4	I will have a successful career in engineering		

Second Order Latent Variable	First/Higher Order Latent Variable	Construct's Meaning	Items' Code	Construct's Items	Validity Index	Source
STEM Self-efficacy	Science Identity	Scientific qualities, beliefs and personality traits of being a scientist	SID1	Learning science in school will help me to succeed later in life	>0.75	Items adopted from Aghekyan (2019)
			SID2	I am confident I can master the skills taught in my science class		
			SID3	I consider science topics very interesting and engaging		
			SID4	When it comes to learning science, I think of myself as a science person		
			SID5	My peers and teachers think that I am knowledgeable in science		
			SID6	I am certain I can figure out how to do the most difficult science class work		
			SID7	My friends and family recognize me as a scientist		

Research Hypotheses

H_{01}. Science, mathematics and engineering self-efficacies positively and significantly correlated
with senior school physics students' science identity;

H_{02}. Gender positively and significantly moderated the relationship between science, mathematics and engineering self-efficacies and physics students' science identity;

Method and Measurement

This study was a co-relational study that uses the primary data gathered through face to face questionnaire administration to the senior secondary school physics students that are currently writing their external exit examination in 2023/2024 session. The choice of the respondents was based on the fact that the students are currently and will be applying for course to study at different tertiary institutions to science, technology/engineering and mathematics related careers. The EFA results of Sze et al. (2022) indicated that three factors that include mathematical self-efficacy, engineering/technology self-efficacy and science self-efficacy were outlined as the sub-constructs of the STEM self-efficacy which this study was adopted and rated on four Likert scale of strongly disagree, disagree, agree and strongly agree.. The data collected were analyzed based on variables' relationship. SmartPLS version 4.0.9.2 software was used to determine the relationship among variables.

Demographic Profile of the Respondents
The table 1 described the demographic profiles of the respondents. 300 respondents were engaged to participate in this study and were selected through non-probability sampling (Purposive Sampling). The valid returned questionnaires were 243 and were used to analyze the results. 114 representing 43.9% of the respondents' population were female while 129 representing 53.1% were male.

Table 1
Demographic Profile of the Respondents

Gender		N	%
	Female	114	46.9
	Male	129	53.1
	Total	**243**	**100**
Age	10-15	163	67.1
	16-20	66	27.2
	21-25	14	5.7
	25 & above	-	**-**
	Total	**243**	**100**

Results
Measurement Model

In this context, the values in matrix format represent the HTMT ratio which is used to evaluate the extent to which the each construct discriminates from other constructs in the formed model.

Heterotrait-monotrait (HTMT) of Correlations of the Constructs' **(**Discriminant Validity**)**

Table 2
Discriminant validity table for exogenous and endogenous constructs

Construct	Eng/Tech Self-efficacy	Gender	Mathematics Self-efficacy	Science Identity	Science Self-efficacy
Eng/Tech Self-efficacy					
Gender	0.221				
Mathematics Self-efficacy	0.311	0.305			
Science Identity	0.622	0.268	0.384		
Science Self-efficacy	0.327	0.241	0.475	0.773	

Convergent Validity

The tables 3 below contains the various reliability and validity indexes of the measured constructs in the model. Cronbach Alpha values measures the internal consistency and by extension the extent to which items of a scale or constructed are correlated. The Cronbach Alpha's value closer to 1 indicate stronger internal consistency. The composite reliability (rho_a and rho_c) are also alternative means of calculating the internal consistency of the constructs.

Average variance extracted (AVE) measures the amount of variance captured by the construct in relation to the amount of variance due to measurement error. A higher AVE value equal or above 0.5 indicated significant validity index.

Table 3
Construct validity table for the exogenous and endogenous variables

Construct	Cronbach Alpha	Composite Reliability Rho_a	Composite Reliability Rho_c	Average Variance Extracted (AVE)
Eng/Tech Self-efficacy	0.808	0.832	0.865	0.564
Mathematics Self-efficacy	0.792	0.468	0.758	0.368
Science Identity	0.753	0.795	0.824	0.419
Science Self-efficacy	0.727	0.794	0.835	0.568

RQ[1]. What are the senior school students' science, mathematics and engineering self-efficacies?

Table 4

Mean and standard deviation results of the physics students' science self-efficacy, engineering/technology science self-efficacy, mathematics self-efficacy and students' science identity

	M	SD
Physics Students' Science Self-efficacy	3.448	0.760
Physics Students' Mathematics Self-efficacy	3.250	0.587
Physics Students' Engineering/Technology Self-efficacy Statement	2.908	0.823
Science Identity	3.167	0.859

The mean score of 3.448, 3.250, and 2.908 of a constructs measured in four likert scales indicated that the physics students have high self-efficacy in science, engineering/technology and mathematics. The mean score of 3.167 also revealed that physics students highly recognized themselves as science person.

Structural Model

Testing of the Research Hypotheses

H_{01}. Science, mathematics and engineering/technology self-efficacies positively and significantly correlated with senior school students' science identity;

The results from the table 8 below explained the relationship status between STEM self-efficacies and students' science identity. Science self-efficacy has weak, positive and significant relationship with students' science identity ($\beta=0.174$, $p<.05$). Mathematics self-efficacy has moderate, negative and significant relationship with students' science identity ($\beta=-0.296$, $p<.05$) and engineering/technology self-efficacy has substantial, negative and significant relationship with students' science identity ($\beta=-0.600$, $p<.05$).

Table 5

Direct coefficient table of science, engineering/technology, mathematics self-efficacies and physics students' science identity

Path	Path Coeff. (β)	Coeff. Mean	Remark	T-value	P-value	Remark
Science self-efficacy -> Science identity	0.174	0.167	Positive/Low	3.067	0.002	Supported
Mathematics self-efficacy -> Science identity	-0.296	-0.307	Negative/Moderate	5.808	0.000	Supported
Engineering/Technology self-efficacy -> Science identity	-0.600	-0.608	Negative/Substantial	9.060	0.000	Supported

H_{02}. Gender positively and significantly moderated the relationship between science, mathematics and engineering/technology self-efficacies and students' science identity; The results from the table 9 below explained the relationship status between STEM self-efficacies and students' science identity when moderated by gender. Science self-efficacy has substantial, positive and significant relationship with students' science identity when moderated by gender (β=0.603, p<.05). Mathematics self-efficacy has moderate, positive and significant relationship with students' science identity when moderated by gender (β=0.225, p<.05) and engineering/technology self-efficacy has moderate, positive and significant relationship with students' science identity when moderated by gender (β=0.265, p<.05).

Table 6

Indirect coefficient Table of science, engineering, mathematics self-efficacies and science identity

Path	Path Coeff. (β)	Coeff. Mean	Remark	T-value	P-value	Remark
Gender× Science self-efficacy -> Science identity	0.603	0.604	Positive/Substantial	12.100	0.000	Supported
Gender× Mathematics self-efficacy -> Science identity	0.225	0.231	Positive/Moderate	4.248	0.000	Supported
Gender× Engineering/Technology self-efficacy -> Science identity	0.265	0.272	Positive /Moderate	4.058	0.000	Supported

RQ3. What is the effect size of science, mathematics and engineering self-efficacies on physics students' science identity?

The table 10 above explained the effect size of the STEM self-efficacy sub-constructs. Science self-efficacy and gender has weak/low effect size on students' science identity (f^2=0.041, 0.014), while mathematics and engineering/technology self-efficacies has moderate effect size on students' science identity (f^2=0.260, 0.220).

Table 7

The effect size (f^2 values) of the science, mathematics, engineering/technology and gender on the physics students' science identity

Sub-constructs	f^2
Science Self-efficacy	0.041
Gender	0.014
Mathematics Self-efficacy	0.260
Engineering/Technology Self-efficacy	0.220

RQ4. What variance proportion of the science identity does STEM self-efficacy explained?

The R^2 value in table 11 below shows the variance of students' science identity been explained by the science, engineering/technology, mathematics and gender. The R^2 value of 0.663 indicated that 66.3% of the physics students' science identity is been explained by science, engineering/technology, mathematics and gender.

Table 8
The coefficient of determination/explanatory power (R^2 value) of the exogenous constructs on the students' science identity

	R-square	R-square adjusted
Science Identity	0.663	0.658

Discussion
The present search determines the moderating effect of gender physics students' STEM self-efficacy and its relationship with science identity. The result of the research questions 1 indicated that physics students had moderate self-efficacies in science, engineering/technology and mathematics. The result of the research question 1 revealed that the physics students has the scientific beliefs, qualities and values that can qualifies them as a science person. The direct relationship result between attitude to science, engineering/technology, and mathematics self-efficacies of physics students' and their science identity were relatively low, moderate, substantial negative, positive and significantly correlated. The indirect relationship result when moderated by gender indicated that the relationship between science, engineering/technology and mathematics self-efficacies of physics students and their science identity when moderated by gender were moderate, substantial, positive and significantly correlated. The indirect relationship findings was in line with the results of Alhadabi (2021) that concluded that gender significantly moderated the relationship between science, engineering/technology, mathematics self-efficacies and physics students' science identity. The effect size (f^2) results of the exogenous variables indicated the science, engineering/technology and mathematics self-efficacies have a significant effect size on science identity and the coefficient of determination or explanatory power (R^2) value implies that 66.3% of the students' science identity was explained by the science, engineering/technology and mathematics self-efficacies and science identity.

Conclusion
The findings of this work show the correlation strengths, direction and significance of the physics students' science identity and science, engineering/technology and mathematics self-efficacies. The study employed the usage of the modern statistical method known as structural equation model. The data collected were analyzed via SmartPLS software. The result of this study shows that science, engineering/technology and mathematics self-efficacies and play a significant role in the science identity of physics students. The findings of the students also concluded that students' gender play significant moderating role on the relationship of physics students' science identity and science, engineering/technology and mathematics self-efficacies. The result of this study implies

that physics students still have high self-efficacies in science, engineering/technology and mathematics and this signifies that the reasonable of these students would pursue career in STEM. The study recommended that studies on students' self-efficacies should be carried out often as this would reveal the true reflection of students' belief, ability, and readiness to pursue career in science, technology, engineering and mathematics.

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Teacher Professional Development and Technological Proficiency of Educators: Empirical Evidence from Ethiopia Higher Education Institutions.

Mestawot Beyene TAFESE•,Erika KOPP••

Abstract

Educators (Higher education teachers) play a significant role in equipping future professionals and contributing to societal progress. They are responsible for preparing competent citizens who serve various societal roles. Hence, examining educators' perceptions regarding professional development and technological proficiency is crucial. This study examines educators' perceptions of professional development and technological proficiency in Ethiopian higher education institutions, focusing on curriculum content, interdisciplinary integration, and aligning theory with practice. The impetus for this study is the growing necessity for educators to possess technological proficiency to meet global educational standards and the demand for innovative teacher education programs. It addresses Educators' perceptions of (1) Their technological proficiency, (2) The relevance and interdisciplinary integration of teacher education curricula, (3) The alignment of theoretical and practical curriculum components, and (4) The integration of technological training in teacher development programs. A structured questionnaire was utilized to collect data from instructors across various university categories. The analysis employed descriptive statistics, ANOVA, and post hoc tests. The findings indicate that educators perceive their technological proficiency as moderate (M = 3.0, SD = 0.66) and regard curriculum relevance and interdisciplinary integration as slightly above average (M = 3.1, SD = 0.64). Research universities demonstrate consistently higher scores across all variables, including technological training and curriculum alignment, than comprehensive and applied universities. Technological training integration and the alignment of theoretical and practical elements were identified as areas requiring improvement (M=2.8, SD=0.58; M=2.9, SD=0.67). Significant differences in perceptions were observed based on university type, qualifications, and experience, with research universities exhibiting the highest levels of perceived innovation and technological adoption. The study highlights gaps in technological training and curriculum alignment in Ethiopian higher education, urging strategic policies and resources to improve teacher education programs. By Emphasizing the importance of integrating theory and practice and fostering technological proficiency, the study calls for collaborative efforts to tackle the educational challenges of the 21st century.

Keywords: Teacher Professional Development, Competency, Higher Education, Technological Proficiency.

• Ph.D. candidate Eotvos Lorand University, Institute of Education, mestawot.beyene@ppk.elte.hu
•• Associate Professor, Eotvos Lorand University, Institute of Education, kopp.erika@ppk.elte.hu

Introduction

Teacher education is crucial for teachers to enhance their skills and competence in teaching. It focuses on cultural competence, relational sensitivity, communication, consistency, imagination, and skillful activity application (Forzani, 2011). Teacher education is fundamental for advancing sustainable education in both schools and society. An effective education program can balance innovative concepts and time-tested approaches, equipping learners for the twenty-first century's challenges stemming from the interplay of environment, culture, society, and economy (Mohanty, Kundu, Mukherjee, & Pandey, 2022). Quality teacher education is designed around a clear, shared vision of good teaching. It is coherent in linking theory with practice, offers opportunities to learn aligned with the vision of good education, and offers opportunities to enact teaching(Jenset, Klette, & Hammerness, 2018). The focus on policy and structural adjustments plays a pivotal role in shaping the effectiveness of teacher education programs in equipping aspiring teachers to empower their students for successful futures in both their personal and professional lives (Linda Darling-Hammond, 2015).

Teacher education is a sacred trust because teaching is the work on which all professions depend(Linda Darling-Hammond, 2016). The ability to cultivate sustainable educational environments in the education system and broader society pivots on educators' competence and values, the design of teacher education, and the methods used to prepare teachers for their roles (Rieckmann, 2022). High-achieving countries invest heavily in teacher training and support, offering equitable salaries and professional learning opportunities and distributing well-trained teachers to all students, ensuring a more efficient and effective teaching process(Linda Darling-Hammond, 2016). Hence, investing time, human, and financial resources in teacher education and competency development teachers is crucial to equipping teachers with the competency needed to aspire to and empower future professionals in their personal and professional lives.

Competency in teaching refers to the ability of educators to apply their knowledge and skills in practical settings. This includes planning lessons, managing classrooms, and using student assessments to guide instruction. (Vitello, Greatorex, & Shaw, 2021).Key 21st-century competencies include integrating technology, managing inclusive classrooms, and designing lessons that cater to different learning styles (Real, 2022; Wahyuni & Sugihartini, 2021; Zamora & Zamora, 2022). Teacher resilience is a core competency where educators must develop personal and contextual resources to manage professional challenges (Mansfield, Beltman, Broadley, & Weatherby-Fell, 2016; Ungar et al., 2020).

Teachers must develop skills in curriculum design, ensuring that lessons provide multiple means of representation and cater to diverse learning needs(Akintayo et al., 2024; Jonnaert, Masciotra, Barrette, Morel, & Mane, 2007; Tran & O'Connor, 2024). Emotional competence, including stress management and well-being promotion, is essential for long-term teacher effectiveness(Jennings & Greenberg, 2009; Kyriacou, 2011; Schonert-Reichl, 2017). Early-career teacher competency often focuses on building

professional engagement, resilience, and a sense of experienced well-being. (Johnson et al., 2014). Managing a classroom environment and creating a safe, productive space for learning is a fundamental teacher competency(Vitello et al., 2021). Competence in adaptive teaching involves tailoring lessons to meet student's individual needs, including those with learning difficulties (Alok, 2023; Mavroudi, 2014).

Teachers' ongoing professional development is crucial for maintaining and improving competency in teaching practices (Avalos, 2011; Collin, Van der Heijden, & Lewis, 2012; Linda Darling-Hammond, Hyler, & Gardner, 2017; Guskey, 2002; Sancar, Atal, & Deryakulu, 2021). Teachers must be proficient in incorporating technology into their teaching and using it as both an instructional and administrative tool (Bauer & Kenton, 2005; Gorder, 2008; Instefjord & Munthe, 2016; Oliver & Townsend, 2013; Rogers, 2000). Teacher education plays a foundational role in shaping educators' abilities to manage classrooms, design practical lessons, and integrate new teaching strategies, including the use of technology (Vitello et al., 2021). In higher education, where future professionals develop, teachers must be equipped with advanced competencies that reflect the complexity and diversity of modern learning environments (Real, 2022; Wahyuni & Sugihartini, 2021).

Thus, a high-quality education system requires competent teachers with pedagogical skills, content knowledge, ethical behavior, interpersonal and communication skills, pedagogical adaptability, classroom management, professional development, cultural competence, and technological proficiency conducting studies and identifying areas for improvement in this field can provide valuable insights for policymakers and stakeholders to take proactive measures.

This article explicitly emphasizes the importance of teacher professional development and technological proficiency in higher education. These areas are essential in preparing educators for the constantly changing demands of 21st-century teaching and learning environments. Technological competency is essential because of the increasing role of digital tools in education. Instructors need to adapt to new technologies, both as instructional aids and as administrative tools, to foster student engagement and manage learning processes more effectively(Bauer & Kenton, 2005; Instefjord & Munthe, 2016). By concentrating on technological proficiency, the study aims to assess teachers' utilization and mastery of technology for their professional purposes and guide students in navigating the technological landscape, which is integral to future professional success (Rieckmann, 2022).

Professional development within higher education is essential for preparing instructors who will subsequently train future educators and professionals in diverse fields. This process generates a multiplier effect, whereby enhancing the competencies of higher education institution teachers helps to directly elevate the quality of education delivered across all levels (L. Darling-Hammond, 2015). Given the shift toward blended learning models and the increasing reliance on digital platforms for both teaching and learning, instructors must possess the skills to integrate these technologies effectively,

ensuring that education remains relevant and sustainable in a rapidly changing world(Mohanty et al., 2022).

This study is globally significant because Teacher professional development represents a fundamental pillar of quality education on a global scale. By addressing the challenges of aligning theoretical frameworks with practical applications, professionals can draw parallels to similar gaps in their own contexts, allowing for cross-country comparisons and identifying shared solutions(Linda Darling-Hammond et al., 2017). This research addresses a pervasive issue in contemporary teacher education systems. Technological proficiency is the focus of the study. In the 21st century, technological integration in education is no longer an optional addition but an essential component for effective teaching and learning (Koehler & Mishra, 2009). This study examines the current level of technological proficiency among university teachers. It provides global decision-makers and key stakeholders insights on preparing educators for an increasingly technology-driven education. The study offers empirical evidence for integrating technology training into teacher education programs, which aligns with international goals such as those outlined in the Sustainable Development Goals (SDG 4: Quality Education), which emphasize the role of technology in education (United Nations, 2015).

Researchers in this area identified various Ethiopian education systems and teacher education programs from different perspectives. These include education and teacher education in Ethiopia, which overemphasize theoretical knowledge, which often undermines the development of practical skills and a lack of curriculum relevance to real-world applications. Addressing these issues is vital for enhancing educational outcomes and better preparing students for the demands of the workforce(Mohammed, 2014; Semela, 2014; Yizengaw, 2004). Inadequate teacher preparation, insufficient professional development, and poorly managed pre-service and in-service training further compromise the quality of education(Abebe & Woldehanna, 2013; Zewdie & Bridges, 2000). Additionally, educational reforms have often overlooked local needs and needed more professional involvement, contributing to students' declining performance in national exams.

This highlights the need for urgent improvements in teacher education practices and technological integration (Aweke et al.; Tamrat, 2021). Thus, this study may address the persistent gaps in Ethiopia's teacher education system, which overly emphasizes theoretical knowledge while neglecting practical skills crucial for classroom effectiveness and future employment (Mohammed, 2014; Semela, 2014). Additionally, insufficient professional development and inadequate pre-service and in-service training limit the ability of teachers to deliver quality education(Abebe & Woldehanna, 2013). Tamrat, 2021; stated that Understanding higher education instructors' perceptions of teachers' professional development and technological proficiency is essential for modernizing teacher training programs and improving student outcomes in a rapidly evolving educational landscape.

Hence, this study investigated educators' professional development and technological proficiency from a teacher perspective within Ethiopian higher education institutions. It seeks to enhance our understanding of how teachers perceive their professional growth and the integration of technology into their educational practices. This is also of particular significance in developing and resource-constrained contexts. Although Ethiopia is the case study, the findings elucidate broader issues other developing nations contend with. Several countries face comparable obstacles, including restricted access to resources, insufficient training programs, and gradual technological integration in education (Antoninis et al., 2023). The challenges highlighted, such as interdisciplinary integration and balancing content relevance with technological training, are common in Ethiopia.

These challenges reflect broader global issues that require collaborative solutions. This research facilitates dialogue among specialists, policymakers, and educators from various countries on effective strategies for teacher development in diverse contexts. This research is relevant to specialists worldwide because it provides actionable insights and a transferable framework for addressing persistent gaps in teacher education. It is a foundation for developing innovative strategies to enhance teacher training and technological proficiency, making it a valuable resource for advancing global education systems.

1.1. Research Aim

The primary aim of this study is to examine perceptions of teacher professional development and technological Proficiency within Ethiopian higher education institutions, focusing on educators' perspectives.

1.2. Research Objectives

1. To describe higher education teachers ' perceived level of technological proficiency among educators in higher education institutions.

2. To evaluate higher education teachers' perceptions of the relevance and interdisciplinary integration within the teacher education curriculum.

2. To assess higher education teachers' perspectives on aligning theoretical concepts and practical applications in the teacher education curriculum.

3. To investigate higher education teachers' perceptions of the technological training components in teacher education development programs.

2. Research Method

This study employs a quantitative approach to examine university teachers' perceptions of professional development and technological proficiency in Ethiopia. It focuses on four key areas: technological proficiency, the alignment of theoretical and practical components in teacher education curricula, the interdisciplinary integration and relevance of curriculum content, and the inclusion of technological training in professional development programs. A quantitative methodology is particularly appropriate for this study, as it provides a structured and objective framework that

ensures reliable and valid results while laying the groundwork for evidence-based decision-making (Creamer, 2018; Creswell, 2013).

The primary data collection tool is a five-point Likert scale questionnaire, which allows for systematic measurement of perceptions by having participants rate their agreement or disagreement with specific statements. Likert scales are well-regarded for their effectiveness in capturing attitudes and opinions in a quantifiable manner(Joshi, Kale, Chandel, & Pal, 2015). This method ensures consistency across responses and enables researchers to comprehensively and comparably evaluate various variables, including technological proficiency, curriculum alignment, interdisciplinary integration, and technological training (Boone Jr & Boone, 2012). Furthermore, the Likert scale facilitates efficient data collection from large and dispersed populations, yielding robust results suitable for statistical analysis and subgroup comparisons (Cohen, Manion, & Morrison, 2018).

The structured questionnaire, utilizing a five-point Likert scale, delivers precise and actionable insights for policymakers, educators, and other stakeholders concerning critical aspects of teacher education programs in Ethiopia. This methodology facilitates a comprehensive understanding of participants' perceptions and supports robust statistical analysis to draw meaningful conclusions (Creswell & Creswell, 2017; Tashakkori & Teddlie, 2010). The study aims to assess higher education teachers' perceptions of teacher professional development and technological proficiency by implementing self-developed five-Likert scale questionnaires. Through the integration of expert reviews, an ethical evaluation process that ensures the confidentiality of study participants, a pilot testing phase, and the incorporation of feedback from participants, as well as the implementation of a statistical evaluation approach, the development of self-administered questionnaires can be optimized to achieve high levels of acceptability, thereby ensuring their efficacy as instruments for the collection of meaningful data(Boone Jr & Boone, 2012; Cohen et al., 2018; Taber, 2018; Zamanzadeh et al., 2015).

2.1. Data Gathering Procedure and Tool

Following a comprehensive literature review, five Likert scale questionnaires were developed, meticulously assessed, and refined with input from the supervisor and field experts. Subsequently, the tool was submitted to the institutional review board for ethical approval. Once the requisite approval had been obtained, a pilot study was conducted to assess the reliability of the instruments. To test the efficacy of the questionnaires, I distributed them to a sample of 50 university teachers. The tool's reliability was confirmed using Cronbach's alpha, confirming its dependability. The reliability of the variables is demonstrated by high reliability across all variables, with each scoring above 0.70 and an overall score of 0.94. Subsequently, the primary data were distributed through the Qualtrics software platform to 460   higher education teachers and 450 respondents who completed the survey.

2.2. Sampling procedures and scientific sample size determination
2.2.1. Stratified random sampling procedures.

In our study, we assessed all the prominent public universities in Ethiopia and arranged them according to the Ministry of Education's most recent classification. Our stratification strategy was based on this classification. A diagram of the university selection process is provided (see Fig. 1).
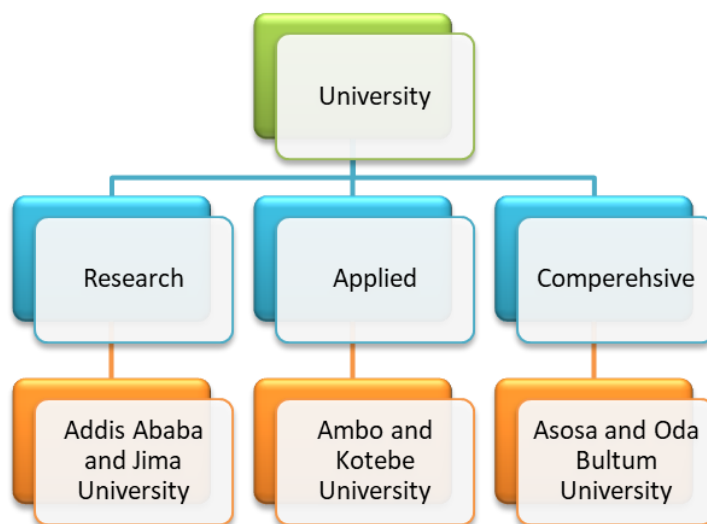
Figure 1 shows the sampling techniques used in Ethiopia's higher public institutions.

To choose educators proportionately from each university, we employed a stratified random selection process in conjunction with a basic random sampling technique. We view teachers as varied between universities and homogeneous within a university. Three strata were defined as part of our technique. All teachers at applied universities were included in the first stratum, teachers in research universities were included in the second, and teachers in general or comprehensive universities were included in the third.

2.2.2. Scientific Sample Size Determination

Stratified random sampling was used to analyze the sample size calculation for this study's 95% confidence level proportions. This formula is determined using the study's sample size(Cochran & Talwani, 1977).

$$n = \frac{Z^2 . p . q}{e^2}$$

Where:

"n = the overall sample size determined by the formula.

Z = The Z-score that corresponds to the desired level of confidence

p = The approximate proportion of success

q = $1-p$ Proportion of Failure

   e = the allowable margin of error

The formula for the calculation is as follows at a 95% confidence level, where Z=1.96, p=0.5, q=0.5, and e=0.05"

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2} = \frac{3.8416 \times 0.25}{0.0025} = 384$$

The researchers took into account a 50% chance for each because there is little literature in this field. We carefully considered the 15% sampling nonresponse and a 5% permissible margin of error. The entire sample included 460 university instructors. Four hundred sixty instructors received the questionnaire through institutional email addresses and the Qualtrics platform. Out of them, 450 teachers finished the survey, and just ten respondents did not.

2.3. Data analysis method

The researchers used both descriptive and inferential statistics in this article. Using SPSS 29, descriptive statistics, including frequency distributions, mean, and standard deviation, were used to give a thorough picture of the data. However, acknowledging that descriptive statistics alone are inadequate for drawing policy conclusions and making informed decisions, we also incorporated inferential statistics. Specifically, we applied ANOVA to evaluate the significant differences in beliefs between the current state of teachers' professional development and the technological proficiency of higher education teachers in Ethiopia. This analysis considered university categories, complemented by Tukey HSD post hoc analysis, which allows for comparisons of university teachers' perceptions across different university categories to identify where perceptions are highest.

2.4. Participants

2.4.1. The sociodemographic characteristics of respondents

This section provides an in-depth overview of the sample group by delving into the respondents' demographic characteristics. According to the descriptive analysis of the study, 460 instructors from a broad group were given the questionnaire. Of these, 450 completed the survey, 335 (74.4%) were men and 115 (25.6%) were women. The qualifications of the responders were equally varied, with 173 (61.6%) having a PhD or above and 277 (61.6%) having an MA/MSC.

200 (44.4%) instructors from Research University, Applied University 146 (32.4%), and Comprehensive University 104 (23.1%) participated in the survey, according to the university categories analysis. The results of the teachers' experience indicate that 26 (5.8%) have 1–5, 127 (28.2%) have 6–10, and 141 (31.3%) have 11–15.

Table 1

Summary results based on the sociodemographic characteristics of respondents.

Variables	Category	Frequency
University category	Research University	200
	Applied University	146
	Comprehensive University	104
	Total	450
Gender	Female	115
	Male	335
	Total	450
Educational level	MA/MSC	277
	PhD and above	173
	Total	450
Work experience	1-5	26
	6-10	127
	11-15	141
	16-20	96
	21-25	53
	26 and above	7
	Total	450

3. Results of the study

This section presents the study's results, including the results of the perception of university teachers regarding teacher education program content relevance and interdisciplinary integration, the current level of technological proficiency teachers in higher education institutions, the perception of university teachers on the integration of the teacher education curriculum's theoretical and practical implementation, and perception of university teachers the extent of technological training components integrated into teacher education development programs. This result may help to understand the perception of the university on Professional development and technological proficiency of educators. After that, we use inferential statistics to present our findings using ANOVA and Tukey HSD post hoc analysis.

3.1. Results of variables related to educators' professional development and technological proficiency.

Table 2 provides the descriptive statistics for four composite variables derived from multiple scale-type items. Composite scores were obtained by averaging responses across related items on a 5-point Likert scale, where 1 indicates Strongly Disagree and 5 indicates Strongly Agree. The computed mean (M) and standard deviations (SD) illustrate the central tendency and variability of the responses about teachers' perceptions regarding the current technological competency level among higher education

institutions' teachers. Additionally, they reflect the relevance and interdisciplinary integration of teacher education curriculum content, alignment between theoretical and practical implementations of the curriculum, and the integration of technological training components into teacher education development programs.

Table 2

The mean (M) and standard deviation (SD) results of variables related to educators' Professional Development and Technological Proficiency from the teachers' perspective.

Descriptive Statistics			
Major Variables	N	M	SD
The current level of technological competency of educators in higher education institutions	450	3.0	.66
Teacher education program content relevance and interdisciplinary Integration	450	3.1	.64
The integration of the teacher education curriculum's theoretical and practical implementation	450	2.9	.67
The extent of technological training components integrated into teacher education development programs.	450	2.8	.58
Valid N (listwise)	450		

The computed mean(M) and standard deviation (SD) result of The current level of technological competency of educators in higher education institutions (M = 3.0, SD = 0.66), the computed mean of 3.0 indicates that the general perception of the current level of technological competency of educators in higher education institutions is slightly moderate. The standard deviation suggests moderate variability in responses, meaning that while many respondents view this aspect positively, there is some divergence in opinions about the current teacher education program. Content relevance and interdisciplinary integration are (M = 3.1, SD = 0.64). With the highest mean of 3.1, respondents perceive this variable as slightly above average.

Teacher education program content relevance and interdisciplinary integration indicate that perceptions are consistent, with many respondents sharing a similarly positive view of integrating the teacher education curriculum's theoretical and practical implementation(M = 2.9, SD = 0.67). The mean of 2.9 shows that beliefs are closer to neutral, but under average points, the average point is 3. The relatively high standard deviation indicates that perceptions vary more widely, suggesting that some respondents may view this aspect above moderate or under moderate than others.

Integrating technological training components into teacher education development programs (M = 2.8, SD = 0.58), this variable has the lowest mean (2.8), showing that it is perceived as the least under moderate out of the four variables, with the perception hovering around neutral. However, the lower standard deviation suggests that beliefs of this variable are more consistent among respondents, indicating less variation in opinions. Generally, to describe a teacher education program, content relevance and

interdisciplinary integration are better-perceived aspects of higher education, with the highest mean score. However, the lowest mean score could indicate that the integration of the teacher education curriculum's theoretical and practical implementation is seen as less favorable or potentially needs improvement within the context of higher education. The moderate standard deviations across all variables suggest that while there are generally positive perceptions, opinions still vary, indicating that not all respondents agree uniformly on these aspects.

Table 3 presents the results of an ANOVA (Analysis of Variance) that tests the perception of higher education institution instructors across different university categories for four variables: the current level of technological competency among instructors in higher education institutions (V1), teacher education program Content relevance, and interdisciplinary Integration(V2), the integration of the teacher education curriculum's theoretical and practical implementation(V3), the extent of technological training components integrated into teacher education development programs(V4). The key metrics include each variable's F-value and Significance (Sig.) level.

Table 3

The result of the ANOVA analysis of variables related to Professional Development and Technological Proficiency from the teachers' perspective.

ANOVA result		
Major variables	F	Sig.
The current level of technological competency of educators in higher education institutions	211.88	<.001
Teacher education program Content relevance and Interdisciplinary Integration	81.64	<.001
The integration of the teacher education curriculum's theoretical and practical implementation.	61.34	<.001
The extent of technological training components integrated into teacher education development programs.	32.942	<.001

(P value <0.05)

The ANOVA tests whether there are statistically significant differences in the perceptions of instructors on the current level of technological competency among instructors in higher education institutions, teacher education program content relevance, and interdisciplinary integration, coherence of the teacher education curriculum's theoretical and practical application, the extent of technological training components integrated into teacher education development programs of higher education institution instructors across different university categories. The significance level (Sig.) is reported as < .001 as the P value is < 0.05 for all variables, meaning that the opinions of instructors among the different categories of the university are significantly different from the current level of technological competency among instructors in higher education institutions, teacher education program content relevance, and interdisciplinary integration, the connection of the teacher education curriculum's

theoretical and practical execution, the extent of technological training components integrated into teacher education development programs.

Table 4 summarizes the results of the Tukey HSD post hoc analysis, which compares university teachers' perceptions across three types of institutions: Comprehensive/General Universities, Applied Universities, and Research Universities. This analysis focuses on their perception regarding four key variables: 1. Educators' Current level of technological proficiency. 2. Content relevance and interdisciplinary integration in teacher education programs 3. The extent of technological training components in teacher education. 4. Alignment between theoretical and practical implementation of teacher education curricula.

The post hoc analysis (Tukey HSD) highlights significant differences in university teachers' perceptions across various dimensions. Research universities consistently receive the highest ratings. In terms of technological proficiency, they are rated significantly higher than Comprehensive/General Universities (mean difference = 0.570, $p < 0.001$) and Applied Universities (mean difference = 1.173, $p < 0.001$). At the same time, Comprehensive/General Universities have a higher perception rate than Applied Universities (mean difference = 0.603, $p < 0.001$). Regarding the relevance of teacher education programs, research universities also lead, with significantly higher ratings compared to comprehensive/general universities (mean difference = 0.741, $p < 0.001$) and applied universities (mean difference = 0.591, $p < 0.001$).

However, this area has no significant difference between Comprehensive/General and Applied Universities (mean difference = -0.150, $p = 0.088$). Similarly, research universities excel in technological training, with notably higher ratings than comprehensive/general universities (mean difference = 0.688, $p < 0.001$) and applied universities (mean difference = 0.805, $p < 0.001$). In contrast, no significant difference is observed between comprehensive/general and applied universities (mean difference = -0.117, $p = 0.165$).

In terms of aligning theoretical and practical aspects of the teacher education curriculum, research universities again receive significantly higher ratings than both comprehensive/general universities (mean difference = 0.506, $p < 0.001$) and applied universities (mean difference = 0.496, $p < 0.001$), with no significant difference noted between comprehensive/general and applied universities (mean difference = 0.010, $p = 0.985$). Research universities consistently achieve the highest ratings across all dimensions, excelling in technological proficiency, program relevance, training, and curriculum alignment.

Table 4

The Tukey HSD post hoc analysis results of variables related to educators' Professional Development and Technological Proficiency comparing university teachers' perceptions across three types of universities

			Tukey HSD post hoc analysis results				
Dependent Variable	(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.	95% Lower Bound	Upper Bound
The perceptions of university teachers on the Technological Proficiency of Educators	Research University	Comprehensive/ General University	.57037*	.05152	<.001	.4492	.6915
		Applied University	1.17328*	.05802	<.001	1.0368	1.3097
	Comprehensive/ General University	Research University	-.57037*	.05152	<.001	-.6915	-.4492
		Applied University	.60291*	.06170	<.001	.4578	.7480
	Applied University	Research University	-1.17328*	.05802	<.001	-1.3097	-1.0368
		Comprehensive/ General University	-.60291*	.06170	<.001	-.7480	-.4578
The perceptions of university teachers Teacher education program Content relevance and Interdisciplinary Integration	Comprehensive/ General University	Applied University	-.14986	.07090	.088	-.3166	.0169
		Research University	-.74078*	.06668	<.001	-.8976	-.5840
	Applied University	Comprehensive/ General University	.14986	.07090	.088	-.0169	.3166
		Research University	-.59092*	.05921	<.001	-.7302	-.4517
	Research University	Comprehensive/ General University	.74078*	.06668	<.001	.5840	.8976
		Applied University	.59092*	.05921	<.001	.4517	.7302
The perceptions of university teachers on The extent of technological training components integrated into teacher education development	Comprehensive/ General University	Applied University	-.11724	.06450	.165	-.2689	.0344
		Research University	.68824*	.07263	<.001	.5174	.8590
	Applied University	Comprehensive/ General University	.11724	.06450	.165	-.0344	.2689
		Research University	.80548*	.07723	<.001	.6239	.9871
	Research University	Comprehensive/ General University	-.68824*	.07263	<.001	-.8590	-.5174
		Applied University	-.80548*	.07723	<.001	-.9871	-.6239
The Perceptions of University Teachers on the Alignment Between the Theoretical and Practical Implementation of Teacher Education Curriculum	Comprehensive/ General University	Applied University	.00980	.05907	.985	-.1291	.1487
		Research University	.50552*	.06652	<.001	.3491	.6619
	Applied University	Comprehensive/ General University	-.00980	.05907	.985	-.1487	.1291
		Research University	.49571*	.07073	<.001	.3294	.6620
	Research University	Comprehensive/ General University	-.50552*	.06652	<.001	-.6619	-.3491
		Applied University	-.49571*	.07073	<.001	-.6620	-.3294

. The mean difference is significant at the 0.05 level.

Table 5

The computed mean and standard deviation results of variables related to educators' Professional Development and Technological proficiency-based qualification are presented.

Descriptives				
Variable	Qualification	N	M	SD
The current level of technological competency of educators in higher education institutions	MA/MSC	251	3.1	.66
	PhD and above	199	2.9	.63
	Total	450	3.0	.66
Teacher education program Content relevance and Interdisciplinary Integration	MA/MSC	251	3.1	.56
	PhD and above	199	3.0	.69
	Total	450	3.1	.64
The extent of technological training components integrated into teacher education development programs	MA/MSC	251	2.7	.65
	PhD and above	199	2.9	.48
	Total	450	2.8	.58
The compatibility of the teacher education curriculum's theoretical and practical execution	MA/MSC	251	2.9	.68
	PhD and above	199	2.9	.66
	Total	450	2.9	.67

The computed mean (M) and standard deviation result of instructors' perceptions based on qualification on education development and instructors' technological competency revealed the current level of technological competency among instructors in higher education institutions. Instructors with an MA/MSC degree have a higher mean score (3.1, SD=.66) compared to those with a PhD or above (2.9 SD=.63). The current level of technological competency among instructors in higher education institutions is moderate; however, the PhD holder service below moderate teacher education program content relevance and interdisciplinary integration instructors with an MA/MSC degree have a higher mean score (3.1, SD =.66) compared to those with a PhD and above (3.0, SD=56), indicating perceptions of teacher education program content relevance and interdisciplinary integration among master's degree holders is slightly above average however PhD holders perceive neutral.

The congruence of the curriculum for teacher education between theory and practice both groups have remarkably similar perceptions with mean scores of (MA/MSC) (M= 2.9, SD=.65) and (PhD and above) (M=2.9, SD=.48). SD), The extent of technological training components integrated into teacher education development programs institutions instructors with a PhD have a slightly higher mean score (M=2.9, SD=.68) compared to those with an MA/MSC (M=2.8, SD=.66), suggesting that PhD holders have a marginally better perception but, both groups perceive that the extent of technological training components integrated into teacher education development programs and institutions is below average.

The provided ANOVA table tests whether there are statistically significant differences in instructors' perceptions to explain the extent of teacher education curriculum content relevance and interdisciplinary integration and to describe the current level of technological competency among instructors in higher education institutions based on their qualifications (MA/MSC vs. PhD and above). The key metrics include the F-value, which measures the degree of variation between groups, and the significance (Sig.) level, which indicates the probability of obtaining the observed results by chance.

Table 6

The ANOVA results of variables related to educators' Professional Development and Technological Proficiency-based qualification are presented.

ANOVA result		
Variable	F	Sig
The current level of technological competency of educators in higher education institutions	22.0	<.001
Teacher education program Content relevance and Interdisciplinary Integration	17.8	<.001
The extent of technological training components integrated into teacher education development programs	5.6	.018
The compatibility of the teacher education curriculum's theoretical and practical execution	.10	.744

(P value <0.05)

The current level of technological competency among instructors in higher education institutions (F = 22.0, Sig. < .001). There is a statistically significant difference in perceptions of the current level of technological competency among instructors in higher education institutions between instructors with MA/MSC degrees and those with PhDs. The high F-value (22.0) and significance level (<.001) indicate that qualifications play a substantial role in shaping perceptions of this variable teacher education program Content relevance and Interdisciplinary Integration (F = 17.8, Sig. < .001)

Like the current level of technological competency among instructors in higher education institutions, there is a statistically significant difference in perceptions of content relevance and interdisciplinary integration in teacher education programs. The F-value (17.8) and significance level (<.001) show that teachers' educational background influences their perceptions of teacher Education program content relevance and interdisciplinary integration among instructors in higher education institutions, with MA/MSC holders again showing better perceptions.

The extent of technological training components integrated into teacher education development programs (F = 0.107, Sig. = 0.744). There is no significant difference in perceptions of the extent of technological training components integrated into teacher

education development programs between instructors with MA/MSC degrees and those with PhDs. The exceptionally low F-value (0.11) and non-significant p-value (0.74) indicate that qualification does not impact instructors' perceptions of to assess the extent of technological training components integrated into teacher education development programs. This aligns with the descriptives showing similar mean scores for both groups.

The compatibility of the teacher education curriculum's theoretical and practical execution (F = 5.62, Sig. = 0.018) shows a statistically significant difference in perceptions Considering the consistency of the teacher education curriculum's theoretical and practical implementation on qualifications. However, the effect is less than the extent of technological training components integrated into teacher education development programs and the alignment between the theoretical and Practical implementation of the curriculum (F = 5.62, p = 0.018). PhD holders tend to perceive and examine the alignment between theoretical and practical implementation of teacher education curricula better than MA/MSC holders.

The following table provided ANOVA results to test the statistical significance of differences in instructors' perceptions of the current level of technological competency among instructors in higher education institutions, teacher education program content relevance, and interdisciplinary integration; the alignment between the theoretical and practical implementation of teacher education curriculum and the extent of technological training components integrated into teacher education development programs across different experience levels. The key metrics are F-value and significance (Sig.) level.

Table 7

ANOVA results of variables related to educators' Professional Development and Technological proficiency-based experience.

ANOVA result		
Variable	F	Sig
The current level of technological competency of educators in higher education institutions	14.2	<.001
Teacher education program Content relevance and Interdisciplinary Integration	5.1	<.001
The extent of technological training components integrated into teacher education development programs	21.4	<.001
The compatibility of the teacher education curriculum's theoretical and practical execution	2.7	.021

(P value <0.05).

The analysis shows that the current level of technological competency among instructors in higher education institutions is (F = 14.2, Sig. < .001). There is a statistically significant difference in perceptions of the current level of technological competency

among higher education institutions based on instructors' years of experience, a high F-value (14.2), and a significance level (<.001).

Instructors with various levels of expertise perceive the current level of technological competency among instructors in higher education institutions differently, and this difference is statistically significant. The result of teacher education program content relevance and interdisciplinary integration (F = 5.09, Sig. < .001). There is a statistically significant difference in perceptions of teacher education program content relevance and interdisciplinary integration based on experience. However, the effect is smaller than that of the current level of technological competency among instructors in higher education institutions. F-value (5.088) and significance level (<.001) indicate that experience influences perceptions of teacher education program content relevance and interdisciplinary integration but not as strongly as for the current level of technological competency among instructors in higher education institutions.

The extent of technological training components integrated into teacher education development programs (F = 2.69, Sig. = .021) There is a statistically significant difference in perceptions of the alignment between the theoretical and Practical implementation of teacher education curriculum (, F = 21.4, Sig. < .001). There is a vital statistically significant difference in beliefs about the alignment between the theoretical and practical implementation of teacher education curricula based on experience. The extremely high F-value (21.4) and significance level (<.001) show that experience has a significant impact on perceptions of the alignment between the theoretical and practical implementation of teacher education curricula. This variable is perceived differently across unique experience levels, indicating a strong relationship between experience and perceptions of the alignment between the theoretical and Practical implementation of teacher education curriculum.

4. Discussion

The findings of this study provide critical insights into the gaps in teacher professional development and the technological proficiency of educators in Ethiopian higher education institutions. Educators technological proficiency was perceived as moderate (M = 3.0, SD = 0.66), reflecting global concerns about educators' readiness to integrate technology into teaching(Sa & Serpa, 2020). This finding suggests persistent challenges in digital competency, particularly in developing regions like Ethiopia, where technological pedagogical content knowledge (TPACK) remains underdeveloped(Koehler & Mishra, 2009). These challenges are consistent with previous research highlighting similar deficiencies in digital literacy among educators in developing countries(Bishaw & Melesse, 2017; Tefera, 2022).

The study also revealed that the teacher education curriculum's content relevance and interdisciplinary integration were rated slightly above average (M = 3.1, SD = 0.64). This finding aligns with earlier studies(Gugssa, 2024; Melese & Tadege, 2019), indicating some progress in curriculum development. However, the alignment between theoretical

and practical components was rated below average (M = 2.9, SD = 0.67), reflecting an ongoing challenge in Ethiopian teacher education programs, which tend to prioritize theoretical knowledge over practical experience(Linda Darling-Hammond et al., 2017; Taddese & Rao, 2023). Technological training within teacher education programs was identified as the weakest area, receiving the lowest rating (M = 2.8, SD = 0.58).

This finding underscores the insufficient integration of technology into teacher development programs and aligns with earlier research pointing to limited ICT adoption in Ethiopian teacher education(Alemu, 2015; Gebretsadik, Ebrahim, & Bezie, 2023; Gokak, Mehendale, & Bhāle, 2023). Despite policy advocacy for ICT usage, a lack of resources and structured training limits its practical implementation(Bass, 2011). Additionally, the study revealed significant differences based on university type, qualifications, and experience. Research universities consistently outperformed comprehensive and applied universities in technological training and curriculum alignment, highlighting resource allocation and innovation disparities.

These findings mirror global patterns where research-intensive institutions are better positioned to adopt technological advancements (Zougheib, 2021). Addressing these disparities requires equitable resource distribution and tailored interventions across university categories. The results highlight the urgent need for Ethiopian higher education institutions to invest in comprehensive reforms that enhance instructors' digital competencies and bridge the gap between theoretical knowledge and practical skills. Such reforms are essential to prepare future educators for the demands of a technology-driven educational landscape.

5. Conclusion

The findings indicate that while educators in Ethiopian higher education institutions perceive their technological proficiency as moderate, curriculum relevance and interdisciplinary integration are viewed as slightly above average. Research universities consistently perceived higher levels of technological training and curriculum alignment than comprehensive and applied universities, reflecting more incredible innovation and technological adoption.

Nevertheless, there are significant areas for improvement, particularly in integrating technological training and aligning theoretical and practical curriculum components. These areas require immediate attention, as they are fundamental to addressing the growing global demand for technologically proficient educators and innovative teacher education programs.

These results highlight the need for comprehensive curriculum reforms prioritizing technological competency and ensuring a cohesive relationship between theoretical concepts and practical skills. Teacher education programs must emphasize hands-on training, equipping educators with the technological tools necessary to excel in modern classrooms.

Moreover, higher education institutions should invest in targeted professional development initiatives tailored to address the diverse needs of instructors, considering their qualifications and experience. Collaboration among stakeholders, universities, policymakers, and international organizations will drive meaningful change. Efforts should be directed toward fostering an environment where technological innovation and practical teaching methodologies are seamlessly integrated into teacher education programs, preparing educators to meet the challenges of 21st-century education. Future research should explore the perspectives of a broader range of stakeholders, assess the effectiveness of specific technological tools in teacher training, and evaluate the long-term impacts of curriculum reforms to inform sustainable solutions.

6. Limitations of the study and future research directions.

6.1. Limitations of the study

Context-specific findings. While the study offers valuable insights into Ethiopian higher education, its context-specific nature limits its applicability to other regions without adjusting for local conditions.

Reliance on self-reported data. The dependence on self-reported perceptions introduces potential bias, as responses may reflect subjective viewpoints rather than actual practices or competencies.

Exclusion of key stakeholders. While perspectives from students, policymakers, and administrators should have been included, critical viewpoints that could inform a more holistic understanding of systemic challenges were omitted.

Limited variable scope. The study needs to address other influential factors, such as funding, institutional leadership, and infrastructure availability, which play significant roles in professional development and technological proficiency.

6.2. Future Research Directions

Cross-national comparisons. Conducting comparative studies across developing and developed countries could uncover shared challenges and context-specific solutions.

Qualitative inquiry. Employing qualitative methods like interviews or focus groups would provide richer insights into educators' lived experiences and the complexities of technological integration.

Longitudinal studies. Tracking the long-term effects of technological training and curriculum reforms could reveal the sustainability and effectiveness of interventions.

Student perspectives. Including teacher education students in future research could help assess how gaps in teacher preparation influence learning outcomes.

Policy implementation analysis. Investigating the gap between policy intentions, such as technology integration, and actual outcomes could help identify systemic bottlenecks hindering reform efforts.

Addressing these limitations and pursuing the suggested research directions can contribute to a richer global discourse on teachers' professional development and

technological integration. Such efforts will help education systems better prepare educators for the challenges of a rapidly evolving, technology-driven world.

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Job Stress and Lecturers' Efficiency In Obafemi Awolowo University, Ile-Ife, Nigeria

Timothy Olugbenga AJADI•

Abstract

The roles of lecturers in universities cannot be underestimated. This is because lecturers are the bones who interpret the content of the curriculum. Hence, lecturers are expected to be efficient. This study however investigated job stress and lecturers' efficiency in Obafemi Awolowo University, Ile-Ife, Nigeria. The population of the study comprised all academic staff in all the 10 Faculties and two Colleges of the University. A sample of 50 participants was selected from each of the five purposively selected faculties. An adapted questionnaire titled titled 'Job Stress and Lecturers' Efficiency (JSLEQ) was used to collect information from the respondents. The instrument was validated and trial tested on population outside the sample. The reliability index of the instrument was 0.91 using Crobatch Alpha method of analysis. Descriptive and inferential statistics were used to answer the research question and test the hypothesis respectively. The results showed that anxiety was the most prominent stress of the six-stress found among lecturers in OAU and that stress has significant influence on lecturers' efficiency in Obafemi Awolowo University, Ile-Ife, Nigeria. The study recommends employment of seasoned counsellors and equipping the counselling unit with 21st century equipment that can be used to manage anxiety among the entire workers in the university

Keywords: faculties, job stress, lecturer's efficiency, psychological stress, and physiological stress

Introduction

The roles of lecturers cannot be underestimated in the university across the globe. This is unconnected to their contributions to interpret the content of the curriculum and in ensuring positive change in student's behavior. In addition, lecturers also assist the student to become a useful member and ambassador of the community and contribute to the economic development of the country. The success of any educational system depends on the efficiency of teachers that translate theory to practice (Omotoyinbo & Olaniyi, 2019). This implies that effective teaching and

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• PhD., Senior Research Fellow, University of Free the State South Africa ajagbesope@yahooco.uk
https://orcid.org/0000-0003-0751-0786

learning activities in the school cannot take place without teaching personnel. To buttress this, Adeagbo (2017) posited that if educational planners have the best educational policies and designs and government allocate largest percentage of it budget to education without efficient teachers, the goals of setting up schools will be a mirage.

An efficient lecturer is the one who is able to use educational facilities available in the university to enhance teaching and learning. Barkhuizen and Rothman (2013) informed that efficient lecturer has the capacity and ability to organise and deliver teaching which brings about increase in learner's cognitive and quantitative abilities. The extent to which a university lecturer achieves the goals of the university using minimum resources without compromising quality is known as efficiency. Lecturer's efficiency can also be described as the use of teaching and learning resources within the university to assist in the development of students cognitive, psychomotor and affective domains. Lecturer's efficiency is hinged on availability of requisite teaching and learning facilities. Institutions that provide needed teaching and learning facilities encourages lecturers to be efficient in discharging their primary responsibilities in the university.

In Obafemi Awolowo University, Ile-Ife, Nigeria, lecturers seem stressed considering multi-faceted task assigned as a result of shortage of staff. In most cases, lecturers looked tired, unfriendly and unhappy. Most of the lecturers teaches many courses than required in a semester, teaches large classes without public address system, non-availability of technological aided instructional materials in the lecture rooms, supervises many undergraduate projects and graduate theses. They are also assigned with the responsibility of processing results, presenting the results at various committees, represent the Deans/Directors/Head of Departments at statutory meetings. They also perform other functions as may be assigned by the administration. These have implication on lecture delivery, response to student's request and giving feedback on student's continuous assessment at regular interval. The resultant effect of this stress is sudden brake down and untimely death of lecturers. There have been recurring cases of lecturer's death in the office in recent times at Obafemi Awolowo University, Ile-Ife, Nigeria which may be traced to stress. In the year 2022 and 2023, the university recorded 12 deaths of academic staff, four of which occurred in the office (Obafemi Awolowo University Bulletin, 2024)

Villeza (2023) identified the following as stress that can be exhibited by individual worker: tiredness, unpleasant lifestyle, anxiety, unhappiness, anger, unfriendly and passivity. Kayode (2024) in her studies on job stress and teachers' efficiency in Osun State secondary schools identified student indiscipline, work overload, inadequate instructional materials, family issues, poor working conditions and relationship with colleagues as various stress experienced by teachers in public secondary schools in Osun State. Stress can be more experiences where workers are given jobs above their capabilities, work in unfriendly environment, without commensurate remuneration

Ricciotti and Hur (2018). According to Centre for Disease Control and Prevention (CDCP, 2018), stress can be positive or negative. It is positive when it encourages workers skill development. However, it is negative when it is prolonged and negatively affect workers efficiency. A worker that experienced negative stress cannot be equilibrium balanced because the state efficiency is affected. Scott (2020), informed that negative stress depleted workers emotionally, depersonalized their issues and increased their depression tendency. Stress can lead to insomnia, hyper/hypo tension depending on the nature of workers body chemistry.

Lecturer's efficiency goes a long way to turn things around in the university. It has to do with lecturer's using minimum resources to achieve the best possible results. It is the ability of lecturers in using the available resources to fulfill educational needs of the stakeholders and continuously improvement of university output. It can also be a professional prowess exhibited in planning carefully, using appropriate materials, communicate with the students, assess students regularly, give feedback and using varieties of teaching pedagogy to bring the best out of the students. Adebayo and Babajide (2018), defined lecturer's efficiency as the ability of a lecturer to perform his duty qualitatively. To Arshadi and Damiri (2017), it is the ability of lecturer to combine and use instructional materials in the university for qualitative teaching and learning Darr (2020), defined it as the capacity of lecturer to organise teaching to increase student's cognitive ability. In a study conducted by Ajadi and Fasanmi (2018) on trade union activities and administrative efficacy in universities in southwestern Nigeria, efficiency is defined as the ability of lecturer to work in line with the university administration with minimum resources without compromising the quality of outcome. Porter and Brophy (2018) concluded that efficient lecturer is the one who manages classroom and curriculum well as well as arranging other activities that will benefit the students in the school in an orderly manner. Many lecturers are not as efficient as expected as a result of various stress occasioned from their job according to Oyebanji (2021)

Stress as a concept has been defined by various authors. This is due to the fact that, everybody did not experience stress the same way. A stressful situation to a person may not be to the other. Roy, Kamath and Kamath (2018) defined it as the imprecise response of the body to any demand for change. It is a natural physical and mental reactions to life experiences and the body's response to anything that requires attention. The authors viewed stress as a reaction of the body system to changes happening within and around it which could be positive or negative. It is a state of tension experienced by individuals confronting with extra-ordinary demands, or constraints (Lehloo, 2017).

To Lazarus (2000), stress could be physiological or psychological. It is physiological when it is related to the physical reaction of the body to situations. To buttress this, Ayinde, Adeniyi and Thomson (2018) noted that physiological stress is experienced when there is a disturbance in the body state of equilibrium. Therefore,

stress can be regarded as physiological response to events and situations that causes an upset in the homeostasis of the body. Examples of physiological stress are: headache, migraines, body pains, fatigue, heart palpitation, inadequate sleep, muscle ache and chest pain. According to Ayinde, Adeniyi and Thomson, these manifestations directly and negatively affect worker's efficiency, and personal health

Psychological stress on its own directly affect the way situations are evaluated. According to Jacob (2018), psychological stress is an emotional reaction where individuals show symptoms like anxiety, depression, burnout, hostility, nervousness, irritability and frustration in response to real stimuli. Leung, Chan and Chen (2017), posited that psychological stress is a state of mind resulting from demands on individuals.

To Scott (2020), stress is a wide spread phenomenon during human life. Everybody at a point in time experience stress at different levels since stress is one of the special characteristics of life. It can be any type of change that causes physical, emotional or psychological strain. Auerberg and Adiele (2020) defined stress as the adverse reaction of a person to excessive pressure placed on him or her. Stress represents a negative life experience, closely followed by physiological, cognitive, emotional and behavioural changes that focus on changing the event. Therefore, stress is the result of a subjective assessment of a particular individual who do not have the capacity to manage the emerging situation. Every situation that requires adaptation can be referred to as stress. Summarily stress can be referred to as a personal experience caused by pressure on individual, and impact upon individual's ability to cope. Stress is part of human life experience. As a matter of fact, every individual regardless of race, cultural, gender, status, occupational or social background experiences stress in diverse ways. It is an inevitable part of challenges that prompt mastery of new skills and behavioural pattern. However, when stress becomes excessive, issues occur and individual's experience disrupted emotional, cognitive and physiological functioning. The cost of stress in terms of social and psychological cannot be estimated. Hence, it must be avoided as much as possible

In a study conducted by <u>Subair, Abe, and Aliu. (2021) on job stress and teachers' coping strategies in Nigerian schools. The study</u> concluded that, 60 – 90 percent of illness confronting lecturers in the Nigeria Universities, are stress related cases. This implies that stress may have devastating implication on efficiency of lecturers. Earlier Okeke and Diamini (2013) conducted a study on job stressors that impinge teachers' efficiency in secondary schools in Swaziland. The participants included 239 teachers selected from Hhohho region of Swaziland. The study found that teachers effectively delivered lesson, provide feedback on student take home assignment despite the shortage of teachers in most secondary schools in Swaziland. In a related development, Wade and Travis (2021), found no relationship between job stress and teacher's productivity at the adolescent class. Laibah (2017) conducted a study on stress and employee's performance in manufacturing sector in the United Kingdom

the study found a negative relationship between job stress and employees job performance in manufacturing sector in the United Kingdom.

In another study conducted by Wagnar (2016) on stress and job performance of employees of private universities, Karachi, Pakistan. The study revealed reward system, leadership styles, employment policies as factors affecting employee's performance as against stress. Vanishree (2016) also found positive relationship between tiredness and time of response to student request in developed world. In the work of Panigrahi (2017), on managing stress at workplace. It was established that workers happiness is a motivation to attend to student request. In a study carried out by Wanjul (2017) on stress and teacher's efficiency in public secondary school in Wajir North district, Kenya. The study revealed negative impact of stress on time taken to give feedback on students take home assignment.

Problem

Lecturers constitute essential component of the university. This is because, they translate curriculum to practice, teach allocated courses, respond to student's academic request without delay and provide timely feedback on student's performance in continuous assessment before the end of the semester examinations. In addition, there are other responsibilities of a lecturers in the university for the smooth operation of the institution. However, it seems the disposition of lecturers their primary and other responsibilities in Obafemi Awolowo University are not encouraging. This is evident from the lectures delivered, the time taken to respond to student's request, time taken to give feedback on continuous assessment, lecturer's reaction to situation on campus**.** This may be traced to stress being experienced as shown in their appearance and relationship with students. This need to be urgently looked into to avert sudden brake down and untimely death of lecturers in Obafemi Awolowo university, Ile-Ife, Nigeria.

Study Objectives

The study is set to address the following objectives

1. Identify the most prominent stress among lecturers in Obafemi Awolowo University, Ile-Ife, Nigeria
2. Investigate the influence of stress on lecturer's efficiency in Obafemi Awolowo University, Ile-Ife, Nigeria

Methodology

The descriptive research design of the *ex post facto* was adopted for this study. The design was appropriate because the study reported how job stress influences lecturers' efficiency in Obafemi Awolowo University without any form of manipulation by the researcher . The population for the study comprised all academic staff from the 10 Faculties (Administration, Agricultural Science, Arts,

Education, Environmental Design and Management, Law, Science, Social Sciences, Pharmacy, and Technology) and two Colleges (Health Science and Postgraduate Colleges) in Obafemi Awolowo University, Ile-Ife, Nigeria. The multi-stage sampling procedure was adopted for this study. The first stage was the use of purposive sampling technique to select five Faculties (Environmental Design and Management, Agricultural Science, Law, Technology and Pharmacy) with five-year programmes duration. The second stage was the use of disproportional sampling technique to select 50 participants from each of the selected Faculties making a total of 250 participants altogether.

An adapted questionnaire titled 'Job Stress and Lecturers' Efficiency (JSLEQ) was used to collect information relating to Lecturer's demographic data, types of stress as well as stress and lecturers' efficiency. The questionnaire was developed by the researcher with three sections (A, B and C). Section A comprised demographic information of the respondents with 5 items. The respondents are to choose an option that is most applicable to them among the options provided in this section. Section B in the instrument contained 6 items on the types of stress, while section C comprised 12 items to measure the influence of stress on lecturers' efficiency. These two sections are structured in 4-point Likert –scale format of Strongly Agreed (S/A), Agreed (A), Disagreed (D) and Strongly Disagreed (SD). The respondents are to respond to the items by indicating their level of agreement to each of the statements in the appropriate column provided for each of the scales

The instrument was validated and trial tested. To ensure that the instruments was reliable, test-retest of the instrument was carried out on 20 academic staff from the College of Health Science of the University, which was not part of the faculty where the sample was drawn for this study. The reliability index of 0.91. was obtained for the instrument which was considered adequate for the instrument. The data was collected with the assistant of two research assistants who were given orientation by the researcher for one day for effective administration and to ensure a high turnover of administration of the questionnaire

The research question was answered with percentage and mean of the descriptive statistics while the hypothesis was tested with Pearson Product Moment Correlation (PPMC) of the inferential statistics using the Statistical Package for Social Sciences (SPSS). The research assistants approached the respondents and voluntarily participated in the filling of the questionnaire. The items in the questionnaire does not conflict with respondents' interest, faith and belief. In addition, it did not have negative implications on their job, health and family.

Results

Research Question: What is the most prominent stress among lecturers in Obafemi Awolowo University, Ile-Ife, Nigeria?

Table 1

Stress Among Lecturers (N=250)

S/N	Stress	S/A (%)	A (%)	D (%)	SD (%)	Mean ($\bar{x}$)	Rank
	Headache	43 (17.2%)	147 (58.8%)	52 (20.8%)	8 (3.2%)	2.79	4th
	Body Pain	31 (12.4%)	141 (56.4%)	65 (26%)	13 (5.2%)	2.75	5th
	Heart Palpitation	55 (22%)	135 (54%)	48 (19.2%)	12 (4.8%)	2.69	6th
	Anxiety	73 (29.2%)	136 (54.4%)	32 (12.8%)	09 (3.6%)	2.92	1st
	Depression	55 (22%)	133 (53.2%)	60 (24%)	02 (0.8%)	2.86	2nd
	Burnout	50 (20%)	152 (60.8%)	38 (15.2%)	10 (4%)	2.83	3rd

Source: Researcher's Field Work 2024

Result presented in Table 1 showed that the most prominent stress among lecturers in Obafemi Awolowo University was Anxiety ($\bar{x}$ = 2.92). Seventy-three (29.2%) of the respondents strongly agreed that anxiety was most prominent stress, 136 54.4%) of the respondents agreed, 32 (12.8%) disagreed while only nine (3.6%) strongly disagreed. This was followed by Depression ($\bar{x}$ = 2.86). Fifty-five (22%) of the respondents strongly agreed that depression was most prominent of the stress, 133 (53.2%) agreed, 60 (24%) disagreed while two (0.8%) strongly disagreed. The third most prominent stress according to this result was Burnout ($\bar{x}$ = 2.83). Fifty (20%) of the respondents strongly agreed that burnout was the most prominent of the stress, 152 (60.8%) agreed, 38 (15.2%) disagreed while 10 (4%) strongly disagreed. This was followed by Headache ($\bar{x}$ = 2.79). Forty-three (17.2%) of the respondents strongly agreed that headache was the most prominent of the stress, 147 (58.8%) agreed, 52 (20.8%) disagreed while eight (3.2%) strongly disagreed. Body pain was the fifth most prominent stress in Obafemi Awolowo University ($\bar{x}$ = 2.75). Thirty-One (12.4%) of the respondents strongly agreed that headache was the most prominent of the stress, 141 (56.4%) agreed, 65 (26%) disagreed while 13 (5.2%) strongly disagreed. This placed headache on the fifth position on the list of the most prominent of the six stresses on the list. The least most prominent among all the identified stresses among lecturers in Obafemi Awolowo University was Heart Palpitation ($\bar{x}$ = 2.69). Fifty-five (22%) of the respondents strongly agree to the assertion that heart palpitation was the most prominent of the

identified stresses, 135 (54%) agreed, 48 (19.2%) disagreed while 12 (4.8%) strongly disagreed.

Hypothesis

Stress has no influence on lecturer's efficiency in Obafemi Awolowo University, Ile-Ife, Nigeria

Table 2

Influence of stress on lecturer's efficiency in Obafemi Awolowo University, Ile-Ife, Nigeria

Variables	X	SD	N	df	Cal. R	Critical R
Stress	32.65	16.31				
Lecturer Efficiency	42.38	22.10	250	96	.54	.157

Significant, P< 0.05.

Result presented in Table 2 showed that stress has significant influence on lecturer's efficiency in Obafemi Awolowo University, Ile-Ife, Nigeria. The result showed that calculated value is greater than the critical, 0.54 > 0.157 at p.<0.05.

Discussion of Results

The result to the research question answered by the respondents showed that stress among lecturers in Obafemi Awolowo University can either be psychological or physiological. The first three prominent stress are psychological in nature, while the last three are physiological. This supported the work of Lazarus (2000), who categorized stress into physiological and psychological. This might be because the basic needs of lecturers can no longer be met with the economic situation where fuel subsidy was removed and currency devalued without commensurate increase in lecturer's salary. The result might not be unconnected to the prevailing situation in the larger society where lecturer's salary can no longer sustain him or her, talk less of taken care of their immediate family. Payment of lecturers' ward school fees and satisfaction of other domestic needs at home can lead to anxiety which was identified to be the most prominent stress. The economic situation in the country where nobody (lecturers inclusive) can budget for anything, cannot be sure of getting needed items even for the children. These can trigger anxiety at any time. If anxiety is not properly managed, the next stage is depression. This result is in line with the work of Jacob (2018), who concluded that psychological stress is an emotional reaction where individuals show symptoms like anxiety, depression, burnout, hostility, anxiety, nervousness, irritability and frustration in response to real stimuli. In addition, it is in agreement with the work of Leung, Chan and Chen (2017), who posited that psychological stress is a state of mind resulting from demands on individuals.

The results revealed from the hypothesis tested might be a reason why lecturers in Obafemi Awolowo University are dropping dead in the offices. The study established

that stress has influence on lecturers' efficiency. This might be one of the reasons why stress have devastating effect on lecturers' ways of discharging their responsibilities in Obafemi Awolowo University. Ile-Ife, Nigeria. This might also be the reason why lecturers are unable to give their best in the class, give no continuous assessment scores to the students prior the examination and respond late to other students' requests. The finding is however against that of Okeke and Diamini (2013) who found that teachers effectively delivered lesson, provide feedback on student take home assignment despite the shortage of teachers in most secondary schools in Swaziland. In a related development. This finding also negated that of Wade and Travis (2021), who found no relationship between job stress and teacher's productivity. In addition, the result also negated that of Laibah (2017) who found a negative relationship between job stress and employees job performance in manufacturing sector in the United Kingdom. However, the study is in line with the findings of Vanishree (2016) who found positive relationship between tiredness and time of response to student request in developed world. The result is also in line with the finding of Panigrahi (2017), who conducted studies on managing stress at workplace and established that workers happiness is a motivation to attend to student request.

Suggestions/Recommendations

The following are recommended based on the findings of this study:

1. University Administration should create internal reward system to be approved by the University Governing Council for lecturers
2. The University Administration should employ seasoned counsellors and equip the counselling unit with 21st century equipment that can be used to manage anxiety and other types of stress among the entire workers in the university
3. The government should improve the general working condition of lecturers in the university. Particularly, the salary of lecturers should commensurate with the economic reality in the country.
4. The government should adopt economic policies that will allow stability in the economy so that lecturers and other workers can plan on the expected salary.

Conclusion

The study established that there are psychological and physiological stress among lecturers in Obafemi Awolowo University, Ile-Ife. It was also established that stress has devastating implications on lecturer's productivity and needed to be handled with urgency it deserves so that the lecturers will be able to put in their best into the system. This will allow lecturers to live a healthy live and assist the institution to achieve the aims of its establishment.

Additional Scientific Contributions

This study has scientifically contributed to knowledge. There is little empirical work on job stress and university lecturer's efficiency. Previous studies on lecturers' efficiency focused largely on lecturers' job satisfaction, work environment, managerial skills. This study has tried to shift the focus. Additionally, this study provides a comprehensive assessment of types of stress, the most prominent stress among university lecturers at OAU, as well as the influence of stress on lecturers' efficiency in OAU. This exploration within Obafemi Awolowo University, Ile-Ife, Nigeria context, fills a critical gap in existing literature, which previously lacked extensive empirical data on how internal reward system, employment of 21st century counsellors with adequate facilities translate into improved lecturers' efficiency

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Conceptual and Applied Changes in the Approach to Well-being at School- Systematic Literature Review

Katalin BORBÁTH•, Attila Czabaji HORVÁTH••

Abstract

This paper attempted to outline the interdisciplinary and broad path of well-being until it became a goal in the Learning Compass. The work paid special attention to positive psychology because they agreed that its insights need to be translated into positive pedagogy for the well-being of learners. So, it offers a collection and comparison of the main well-being concepts from different disciplines connected to the learning environment's psychological pedagogical, social, and economic aspects, using the systematic literature review as methodology. The paper also focuses on examples of studies of the concept of well-being, narrowing step by step to the psychological, especially the social and the subjective well-being concepts. It is proven that student well-being is closely linked to the well-being of teachers, and therefore supporting the /subjective/psychological, and professional/ well-being of teachers is essential for the quality learning-teaching process and for achieving the 2030 target summarized in the Learning Compass.

Keywords: dimensions of well-being, mental health models, learning compass, positive psychology, positive pedagogy

1. Introduction

In thinking about schools and education, the influence of positive psychology and - based upon the earlier -positive pedagogy is visible. This is reflected, among other things, in the increasing number of studies on well-being, both for teachers (Roffey, 2012, Kelemen & Kincses, 2015, Viac & Fraser, 2020, Borbáth & Horváth H., 2021) and for students (ISCWeB, HBSC, PISA, Széll et al. 2021). The growing number of studies on the one hand is a piece of welcoming news, on the other hand, we have found, that it is difficult to find parallel traits among the well-being definitions in different disciplines. So one of the reasons we start to work comparing definitions is this broad arsenal of understandings

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• Assistant Professor at the Institute of Psychology, ELTE PPK , Budapest. borbath.katalin@ppk.elte.hu

•• Professor at the Institute of Education, ELTE PPK, Budapest. horvath.h.attila@ppk.elte.hu

with fewer connections. Another practical reason is, to interpret the latest OECD educational goals in Learning Compass, because the importance of the well-being aspect is reflected in the OECD's Compass for Learning (2019), a tool under the OECD's Education and Skills for the Future 2030 project. This report aims to achieve a state of well-being for learners. We assume, that the OECD's aim to reach well-being is a school for 2030 visualized as a compass based upon the economic, social science, and psychological roots. To focus on psychological concepts and models we must state they have been formed decades ago. Positive psychology has started to conceptualize well-being and it has lately a broader and more complex model that includes clinical aspects also. Together with several authors, we believe that theories of positive psychology, especially on well-being ensure a theoretical background for renewing practice in pedagogy, turning towards from black education to a white/ positive education.

The objectives of our literature review are: 1. find connections between main well-being concepts in close discipline fields, 2. point out the development of the concepts, and seek consensus. Another aim is 3. closely examine well-being definitions which are used in the field of school life, students, and teachers. In this case, we use mental health as an interpretational framework. So we will discuss the application of the models presented in schools and how they help to increase the well-being of students. We indicate the role of well-being in the recent OECD learning framework. We highlight the effect of the teacher-student relationship on well-being, as shown in the studies. We also include the presence of mental health and well-being in schools based on relevant research.

2. Methodology: Systematic literature review

2.1. Systematic literature review

The goal of our systematic literature review work was to find all the interdisciplinary concepts and research papers connected to psychological, / subjective/ complex well-being concepts in the field of education, connected to the *learning environment's psychological-pedagogical, social, and economic aspects*

We used the PRISMA 2020 concept (see the flowchart below) as a base for our systematic work (Page et. Al, 2021). In our review, we applied a simplified version of PRISMA 2020 categories because we agreed that counting and using statistical results is irrelevant to our objectives.

As a specification of our inclusion criteria, we admit that we employed academically proven platforms, such as Google Scholar, Researchgate, Elsevier, Eurostat, academic libraries, and open-access academic portals as sources for our search. We must exclude from retrieving the studies we could reach neither via academic access. We also used organization websites connected to the field such as WHO, OECD.org, and thepublichealthinsight.com. We exclude non-up-to-date studies and reports /older than 35-40 years/ too. To minimize bias, we exclude not fully academic literature via controlling literature of the studies.

Outlining the study selection process our strategy was to search for connections between disciplines by seeking relevant studies in each study's literature specification. We include studies that operated with using terms of positive psychology and applying a complex, dimensional, developmental-centered meaning to well-being definition. However, we excluded concepts and studies that are not connected in any meaning to the world of schools or do not hold a complex, developmental-centered concept. For that purpose, we also used specialized terms such as keywords / subjective psychological well-being; complex concept; learning environment; and field of schools;/ as a method for discovering connections between definitions from different fields.
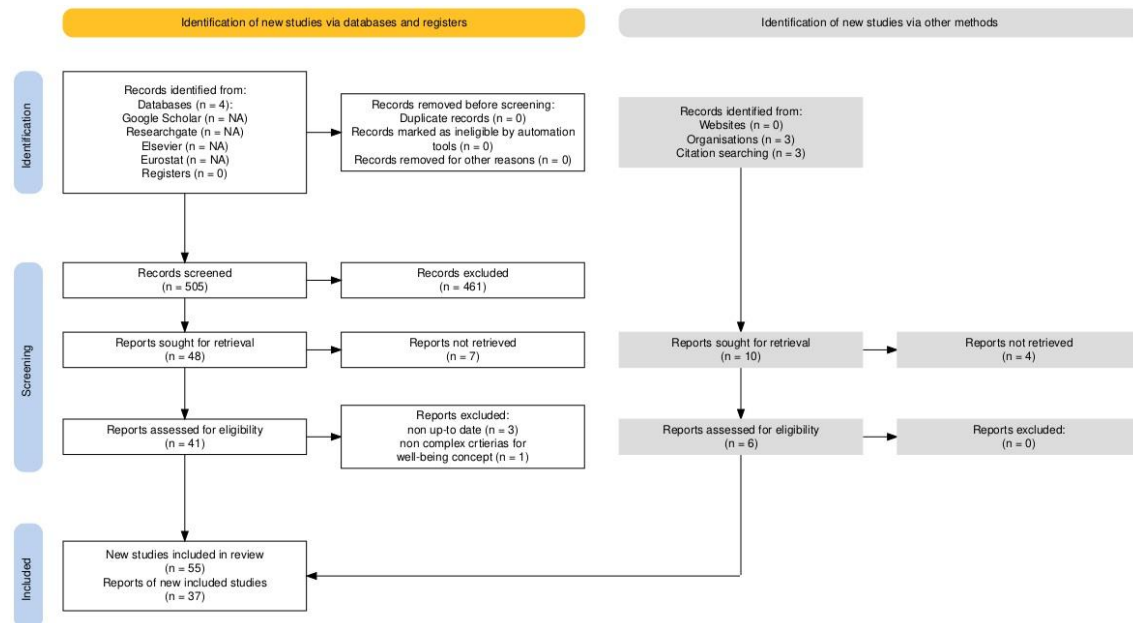

Figure 1. Flowchart of systematic literature review

3. Literature review of the development of the well-being concept

3.1. Well-being concepts

Rojas's study indicates that there is no consensus in the literature on the concept of well-being, with most definitions assuming that well-being is a multidimensional phenomenon (Rojas 2004).

As Halbreich, 2022 'wrote, despite the recognition of the importance of well-being by the WHO, the United Nations, and other welfare there are no universal criteria for optimal or 'normal' well-being, and he pointed out that.

The obstacle to progress in definition and criteria is the Interdisciplinary complex nature of 'well-being'. He stated that augmentation is needed on the Bio-Psycho-Socio-Economic model with cultural and spiritual sensitivities, and we must also add the educational implications, which we will discuss later connected to Learning Compass 2030. Thus, we exhibit the main concepts of well-being in the background of the development of the concept. This article aims to assume the well-being concept and show the permanent development and enrichment of the concept.

Building upon Halbreich's (2022) thoughts we have found differences in the interpretation of well-being depending on whether we meant in a broader sense as the individual well-being concept of OECD uses (see Figure 1.) from the economic perspective or with a narrower perspective, in the psychological phenomenon. Also, it differs whether the focus is on men or women, young or older people, low or high income, or different educational groups, countries, or regions with different levels of development (Viac & Fraser 2020).

According to the WHO (1998) earlier well-being concept, it is defined as a state in which an individual can cope with average levels of daily stress, develop his or her abilities, and perform effectively at work and in the community. Although this definition contains psychological elements and implicitly refers to coping mechanisms talks about the state, and as such the dynamical element of the concept is missing.

A broadly used reference framework for measuring individual well-being, that is developed by the OECD, which includes 11 dimensions: objective, material living conditions, and subjective quality of life dimensions, can be considered a cornerstone of the literature, because of its broad perspective as considering objective and subjective elements also, indicating the interdisciplinary- medical, educational, and personal and social-psychological social-economic, social-ecological, social-political, -nature of the
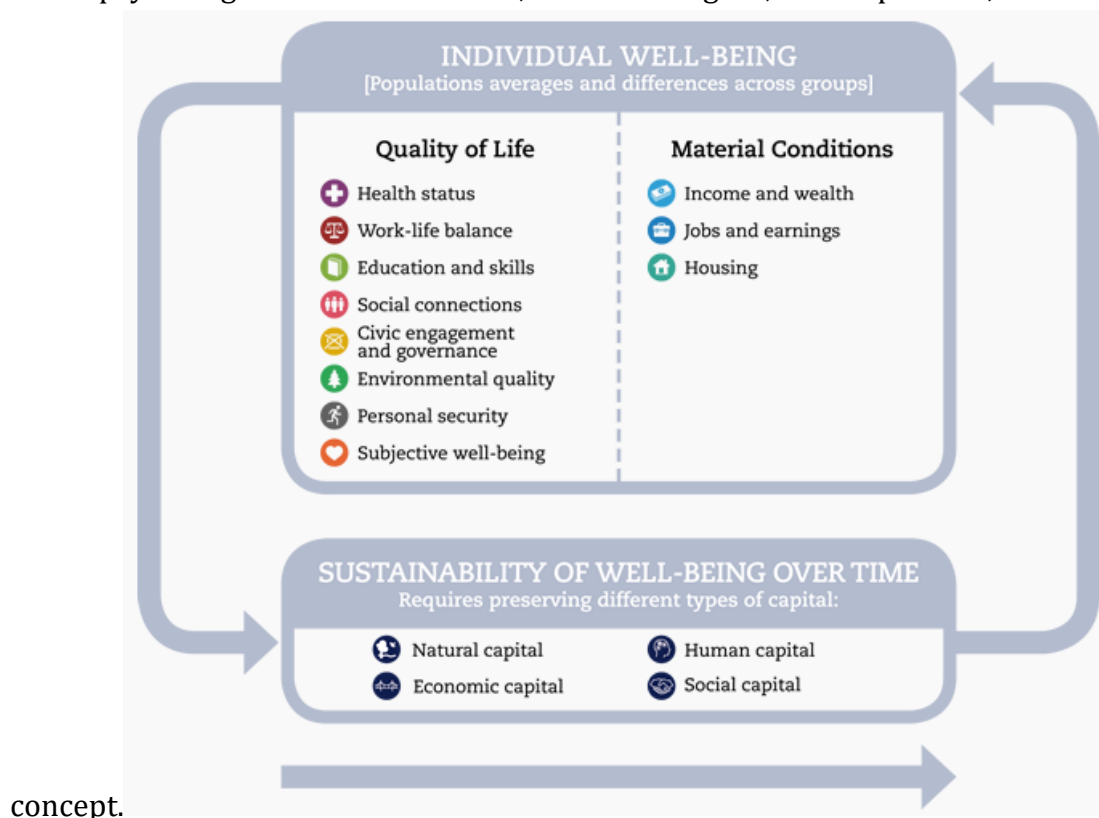
concept.

Figure 2. The OECD conceptual framework of well-being (Durand, 2015)

www.oecd.org/wise/measuring-well-being-and-progress.html

Objective well-being is measurable and observable, while the subjective dimension can be learned from a person's account (Viac & Fraser, 2020). Although subjective well-being is more difficult to measure, researchers from the positive psychology field try to capture it by considering different aspects including personal and interpersonal traits in the context of dynamics of the interpersonal environment and inner world. In Ryff identified the elements of psychological well-being: 1. self-acceptance, 2. purpose in life, 3. autonomy, 4. positive relations with others,5. environmental mastery, 6. personal growth. Keyes took one step forward and talked about and defined the part of the specialized well-being form: social well-being: which contains five elements 1. Social coherence, 2. Social acceptance, 3. Social actualization, 4. Social contribution 5. Social integration (Westhof, Keyes C., 2009). One of the most forward-looking concepts is the one developed by Keyes and Ryff (1995) because it identifies six of these aspects: (1) self-acceptance - a positive evaluation of oneself and one's past; (2) environmental awareness - the ability to manage one's life and the world around us effectively; (3) autonomy - a sense of self-determination and the ability to resist peer pressure; (4) positive relationships with others; (5) personal development; (6) goals in life - the belief that life has purpose and meaning and that we live for this purpose. Later Westhof and Keyes (2009) completed Keyes's and Ryff's well-being concept on the grounds of positive psychology and described *Emotional well-being* as feeling happiness and satisfaction with life, they managed to insert the elaborated positive psychological concept of happiness into the well-being definition.

So, in these terms complete mental health is the presence of emotional, psychological, and social well-being (Westhof and Keyes, 2009).

The next step in the line of refining the well-being concept is McCallum and Price's (2010). Their five-dimensional understanding of well-being also captures the concept at the level of the subject, inserting cognitive, physical, and spiritual parts next to the pre-existed social and emotional elements. The authors later emphasize that the concept of well-being interweaves personal, collective, and environmental elements that interact continuously throughout the life course. By their definition, wellbeing is what we aspire to in our lives, to which we associate positive images, while these are unique to each of us and can provide us with a sense of self and the respect that is necessary to live self (Viac & Fraser, 2020).

The previous subjective/psychological well-being concepts by Keyes and Ryff (1995) Westhof, Keyes (2009), Ryff, Mccallum, and Price (2010) have got an elaborated positive psychology frame, and become the integrated PERMA model, which goes beyond the previously described definition. It is a further elaboration of Martin Seligman's (2011) authentic theory of the joy of life. The author named five components of a life of healthy well-being, which compose a complexum (1) Positive Emotions, (2) Engagement, (3) Relationship, (4) Meaning, (5) Accomplishment. The components mutually reinforce each other to contribute to a state of well-being.

More recently, after the birth of one-dimensional well-being concepts, positive psychology scholars, Jones, You, and Furlong (2013) have investigated the co-occurrence of the main positive traits within a person and examined how they may contribute to well-being. Their concept, the covitality has three levels and is based on research. They found that components of covitality are **hope, optimism, self-efficacy, life satisfaction, happiness, and gratitude. These** research studies have shown how protective personality constructs plays a part in psychological well-being and the absence of psychopathology (Sheridan et al, 2015, Lee et al, 2016)
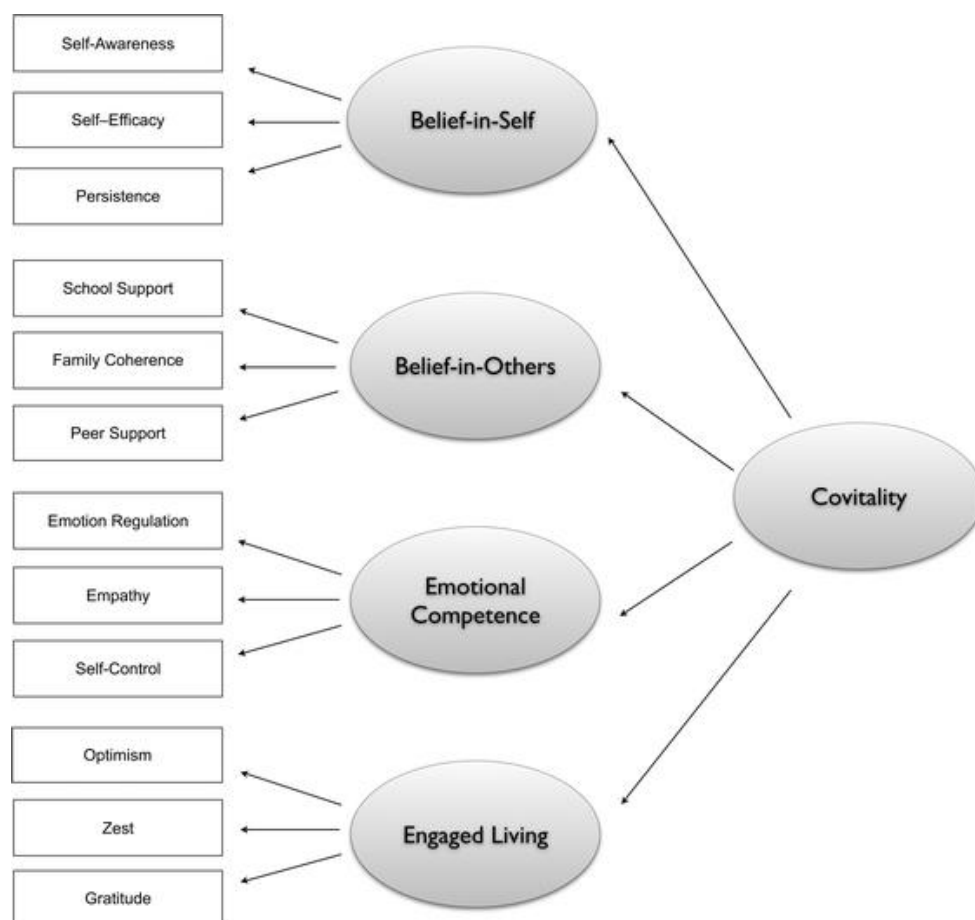
Figure 3. *Covitality model*

(Lee, You, & Furlong - Child Indicators Research, 2016)

Suldo and Schaffer (2008) went even further, while accomplishing the two-dimensional Dual-Factors model of Mental Health. We found that the newest understanding of mental health is Suldo-Shaffer's (2008) *Dual-factor* model. This model includes two dimensions: 1. one counts the level of well-being and 2. the other dimension considers the presence or absence of psychopathology (understanding it as a continuous level).

Table 1

*Dual-factor Model of Mental Health (*Suldo-Schaffer, 2008)

Level of Psychopathology	Level of Subjective Well-Being / SWB/	
	Low	Average to High
Low	II. Vulnerable	I. Complete mental health
High	IV. Troubled	II. Symptomatic but Content

While Keyes (2005) describes *Two-continua* model in the construct after he found in his research, that not all persons thriving who live without mental illness, and not all people can thrive even if struggle with some kind of mental issue.

This concept explains that mental health obtains two different but connected constructs: 1., symptoms of distress, 2., subjective well-being, and or social-emotional strengths (Scheridan and al. 2015).
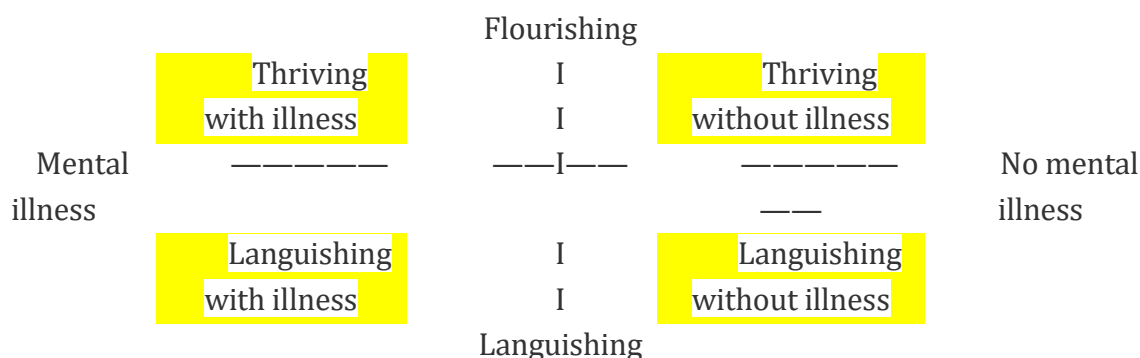
Figure 4 *Keyes's Two-continua Model on Mental Health* (Borgaonkar, 2023)

The new approach in Keyes's model is that in the well-being concept is defined on a continuum, such as the flourishing and languishing continuum. Applying this concept Keyes managed to harmonize his concept the positive psychology, and the clinical approach. "Flourishing" means "a state where individuals have got a high level of subjective well-being with an optimal level of psychological and social functioning" (Westerhof & Keyes,2010) On the other "languishing" part means "the opposite: apathy, sense of restlessness /feeling unsettled/ overall lack of interest in hedonic part of life. Mental illness – which is a proper clinical diagnosis, based on a series of specific symptoms – is in contrast terms of 'flourishing and languishing" which are a fluid series of emotions (Borgaonkar, 2023).

To prove the rich meaning of well-being, -such as an umbrella concept-: the term Social-emotional strengths is more likely used by educational researchers. These have been defined in different ways:1. Epstein and Sharma, (1998) described them as competencies, social-emotional skills, and characteristics for the sake of dealing with adversity and stress. 2. Scales 1999) wrote about internal (positive values and coping skills) and external assets (positive relationships and community support) (Moore et al, 2015).

To go further in definitions, it is essential to make clear where the difference between mental health and the forms of well-being. Halbreich, 2021 cites 'The World Health Organization's (WHO, 2005, 2014) definition, which says health is a state of complete physical, mental and social well-being'. *Mental health is a state of well-being in which every individual realizes his or her potential, can cope with the normal stresses of life, can work productively and fruitfully, and can contribute to the community'* (Halbreich, 2022 cited: WHO, 2022, https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response)

Employing the broader meaning of mental health / Two-continua/ those who meet low risk or distress and indicate higher subjective well-being/ and or strengths will be described as having a complete mental health (Moore et al, 2015). We suggest using *the Two-continua* and *Dual-factor model* concepts because they are synthesized from earlier concepts for mental health, therefore these models are more complex and have richer meanings.

3.2 Applying the well-being concept for school screening and increasing students' well-being

To address the challenge nowadays facing the whole education system, it is worth reviewing the interpretations and dimensions of well-being. How they can be brought into the dialogue about the mental illness and the well-being sides, and how research findings can be used to provide a rich and accurate understanding of the concept so that it can be made more operational in everyday activities?

First of all, the main benefit can be for schools to form the well-being concepts to apply them for screening.

A row of research (Antaramian and al, 2010, Suldo and Shaffer, 2008, Renshaw and Cohen, 2014) supported the *Two-continua* model finding higher levels of student engagement, academic achievement, social functioning, and physical health (Moore and al, 2015).

Furlong recommended screening the complete mental health using *the Two-continua model* as choosing for school mental health screening both problem-focused and strength-focused measurement tools based on self-report (Moore and al, 2015).

The limitations of the positive psychology-based self-report screenings are the close correlation between self-deception and positive psychology variables. Sheridan and al

(2015) report that those persons who score higher on self-deception level also score higher on positive traits of covitality (Sheridan, 2015).

We have found a measurement variation, which can be used as a reflection of the limitation we mentioned above: Stone and Krueger described the three types of the measurement of subjective well-being: 1. *Evaluative* measure- individuals evaluate their life on a 10-grader Likert scale 2. *Experiential well-being* is the measurement of feelings, emotions, and states (happiness, stress, etc.) The examination also happens via Likert scales, and it should be taken in real time. The authors pointed out a row of hardships for the examination of the 3 types (including systematic bias, etc.) and one of them is a need to examine especially experimental well-being in real-time to collect more valid results. 3. Examining *eudaimonia* means measuring individuals think whether their life is meaningful and have got a purpose. We used for examining eudaimonia is the Likert scale as a tool (Stone, Krueger, 2018).

The concept of the PISA 2022 examination is seemingly a complex measurement. On one hand, we state, that it is based upon the two-continua model because it measures signs of distress(mathematic anxiety, etc) and also internal (confidence in the capacity of self-directed learning, life satisfaction) and external assets (measures schools' climate whether it supports students' well-being (students' sense of belonging to the school, teacher support, family support, teacher-family cooperation, etc.), school safety risk, and also measures isolation index. The study has found that students who reportedly felt safer at school also reported performing better and having a greater sense of well-being (PISA, 2022). On the other hand, the PISA survey also examined no psychological background issues connected to the OECD definition of individual well-being (OECD 2011, Durand, 2015), such as gender differences, socioeconomic background, immigration status, study workload issues, personal security perception connected to bullying, social connections via isolation index.

3.3 Research Examining the Connection between teachers and students and its Effects on well-being.

Recently researchers pointed out, that childhood is a critical period for subjective well-being later, in adulthood. Research has shown that emotional health in childhood is a good indicator of subjective well-being as an adult, above cognitive skills. But facts tell that childhood emotional health and subjective well-being are correlated to many factors of family background (structure, finances, quality of parents' relationship, moves,). There are results that some children are more resilient according to detrimental circumstances and events than others (Stone, Krueger, 2018).

Keyes (2010) Two-continua model and the Dual-factor model (Suldo-Schaffer 2008) can explain the occurrence of a phenomenon like resilience. In the first model the third quadrant: of Symptomatic but Content, and in the second model Thriving with Illness contains individuals, who have a good state of subjective well-being, despite inner

struggles. Which easily can mean that they show a kind of resilient behaviour. (The connection between resilience and the two models should be examined.)

In the world of schools, we are increasingly seeing research on student and teacher well-being, and the connection of the two states. In a representative survey, Briner and Dewberry (2007) looked at the well-being of staff in primary and secondary schools. The survey found a strong positive association between staff well-being and student outcomes. They also showed that teacher well-being has an impact on student outcomes. According to Martin & Dowson (2009), positive relationships with key stakeholders are crucial for young people to function effectively in social, emotional, and academic domains. Attila Oláh's (2012) study on the optimal school workload of students emphasizes the role of the teacher, who has to adjust the requirements and the level of workload to bring students into a state of sustained flow because he knows the strengths of children, along which they can meet the expectations and have the optimal experience.

Zsolnai A., and Szabó L., emphasized by examining the student-teacher relationship, that secure attachment between them goes hand in hand firmly with students' better social competence, self-regulation, well-being, and school achievement. They also underlined the fact, that teachers' reactions to problems communicated by students affect students' behaviour and well-being (Zsolnai, Szabó L., 2020)

The results of Bhushan's (2012) study suggest that the psychological well-being of children in institutional education depends on the personality of the teachers who interact with them on a daily and weekly basis. Bhushan found teachers' mental health, which can be equated with well-being as defined by the WHO, to be a major factor in the personality development of both boys and girls. The two research above also support the need to be aware and pay special attention to teachers' well-being, not to forget the impact they make on students' behaviour and mental health (Borbáth & Horváth H. 2012, Borbáth & Horváth H. 2021).

3.4 Research Examining mental health and well-being at school.

Seibt and colleagues (2013), examining the mental health of female teachers, conclude that factors such as energy invested and rate of return, physical complaints, and personal factors already have a significant impact on the mental health of female teachers. These data also confirm that there is an overlap between the concepts of mental health and (psychological) well-being. Roffey (2012) concludes from her research on teachers' psychological well-being that supporting teachers' psychological well-being is an activity that can contribute to the proper quality performance of the teaching profession. In their study, Nagy and Gyurkovics (2016) found that the level of well-being is closely related to optimism.

Salehinezhad (2012) draws attention to the fact that mental health and well-being are closely linked to personality. Well-being is an important component of job satisfaction and engagement because inadequate well-being can lead to dissatisfaction and even to

leaving a job or career (Singh & Billingsley 1996). In the case of teachers, burnout is often found to be the underlying cause of job or career abandonment, even in early-career teachers (Goddard & O'Brien 2006). Réthyné (2016) explains the link between teachers' satisfaction, emotional balance, and readiness to experience well-being, and the effectiveness of their teaching, which also includes providing their students with an emotional education oriented to their individual needs.

Eckleberry-Hunt, Kirkpatrick, and Barbera (2018) found in their physicians' and physicians-on-training's well-being research that the complex concept of burnout measurement has got some validity challenges. In conclusion, they recommend examining well-being from the positive psychology perspective.

Van Horn et al. (2004) defined teachers' teaching well-being refers to teachers' subjective psychological experience of all aspects of their profession, such as positive evaluation of career motivation, work achievement, interpersonal relationships, and physical health (Van Horn et al., 2004).

Several research studies have been published recently on teachers' well-being, which are related to many factors. It can be connected to workplace well-being, meaning satisfaction with issues connected to workplace environment, and career development, leadership. Researchers consider job stress and job burnout. The teachers' well-being model emphasized work, - organization-, and students' behaviour-pressure. According to studies, all these factors can have an impact on teachers' well-being (Wang, 2022).

Borbath (2019) focused on active female teachers' mental health and examined the issue of both mental illness and items connected to subjective well-being. On one hand from the burnout levels and the other hand: from the positive psychology angle-measuring elements of covitality, such as optimism/pessimism.

Borbáth's (2021) study described, that the teachers' harmonious relationships with students and parents provide better mental health and have found that the presence of pessimism is stronger in the case of a reality-centered attitude. The main statement of the study is that the flowability concept contains dispositional elements and complex capabilities and is one of the potential key measurement items of the refined level of professional personality and mental health (Borbáth, 2021). One of the main limitations of this study is that next to valid tests the items of screening measurement of professional personality are under validation.

The study declares that the elaboration of the female teachers' professional personalities is a strong connection with the conscious protection of mental health and psychological well-being (Borbáth, 2021).

3.5 Learning Compass as a learning framework connected to well-being- Well-being in Learning Compass 2030 – a main goal in the newest OECD.

With Seligman et al (2009), positive psychology has arrived at school as positive pedagogy defined the program as education for traditional skills and education for

happiness (Seligman, 2009). Ladnai and Szerencsés (2019) said, that converting the knowledge of positive psychology into positive pedagogy is necessary for the sake of students' well-being.

O'Brien (2013, 2016) stepped one step further, she talks about sustainable happiness and well-being which can be taught but for that, the school system should be changed and trained also. At this point, the vision of the Learning Compass 2030 by OECD has been created and called students and teachers in active roles for a renewing school, for sustainable education which has its main goals such as happiness, well-being, and environment for the 21st century. Learning Compass 2030 gave an even more pragmatic attempt and concludes the main characteristics via which students can play an active role in their future we can connect it with the sustainable education theory.

Educational experts from several OECD nations – but Hughson's (2024) critically said that they do not equally represent the experts of the Global South among the experts compared to the Global North -created a learning framework, and they indicated it as an achievable goal based on mental health and well-being research. The OECD's Compass for Learning 2030 provides a completely new approach to school learning in a meaning that setting well-being (emotional, physical, and social) as its goal. The authors argue that adapting to the unknown conditions of the complex and uncertain world of the future requires transformative competencies, the development and operation of which lead to well-being (Borbáth and Horváth H., 2021). They attribute a significant function to teachers in the process of active learning, based on international education policy studies, and at the same time indicate the changes that are needed in the role of teachers (Borbáth and Horváth H., 2021).

In this interpretation, well-being is a dynamic state: investing in skills development in the present increases the chances of high levels of well-being in the future.

 The concept of learning Compass (2019) gives a prominent role to transformational competencies, i.e. the ability to create new values, to resolve tensions and dilemmas, to feel and take responsibility, as a set of future skills. It underlines the importance of acquiring transformative competencies to adapt to the unknown conditions of the complex and uncertain world of the future. According to the concept, all three areas can be broken down into sub-areas, with the first emphasizing components such as curiosity, open and critical thinking, initiative and entrepreneurship, risk management, and the ability to work with others. If we look at the second area, flexibility, change of perspective and empathy, problem-solving, and conflict management should be highlighted. In the third area, responsibility, compassion and tolerance, reflective thinking, self-awareness, self-regulation, and trust are given an important role. The Learning Compass states that elaboration and development of these areas are also necessary during the school years, so that the individual can adapt goals to the current situation throughout his/her life and can revise his/her goals and even let go of previous goals if necessary. Salmela-Aro (2009) has shown in her study that these skills, which form the basis of transformative competencies, are closely related to well-being. The

results support the conclusion that challenges and demands appropriate to a particular life stage lead to well-being but are certainly related to it (Salmela-Aro, 2009).

The vision of Learning Compass has recently undergone scientific arguments and examinations, and it has shown its limited sides also. Japan researchers (Hayashi et al.2019) examined transformative competencies by analyzing extracurricular school activities on video records. They have found that one of the transformative competencies, namely *Reconciling tensions and dilemmas is a less valid item because there are strong similarities between them. This term needs further specification (Kern and* Wehmeyer ed., 2021, 788p; Masami c Masami Hayashi, 2019)

Hughson's (2024) study pointed out that the OECD as an organization has a strong neoliberal background and is rooted in the global North. Previously, an article by Hughson & Wood (2020) also criticized the learning compass approach, which in their formulation is ecological and leaves education to serve the economy.

4. Conclusions

In conclusion, the main statement is that the well-being concept is an umbrella term, and there are some differences in the usage in various academic areas, which indicates that there is no consensus on the issue. However, it can be stated that subjective well-being as a concept is understandable, as a dimension of mental health.

On the other hand, mental health is approachable, and should be approached from more angles: the clinical side as a burnout issue, and as a positive psychological point of view. Even not just from the covitality perspective, but from broad perspectives, from the angle of resilience, persistence, and self-efficacy. Also, there is a lot of potential to examine well-being as a developing skill, as the Learning Compass 2030 suggests.

Also, the PISA examination uses it as a fundamental element as talking on well-being to examine group dynamics in schools such as school attachment and belonging, and the school climate and bullying issues.

The usability of the above-described well-being concepts is conceptualized in The Compass for Learning, which has exhibited itself as a completely new approach to learning in schools via having the goal of actively achieving well-being for students and teachers. The document understands the student as a student agency, who through initiative, action, and responsibility is willing and able to have a positive impact on his/her life and the world around him/her. In doing so, he or she interacts not only with teachers but also with peers, parents, and communities. Learning is thus a broadly understood activity that goes beyond schooling and in which informal sides also play an important role (Horváth H., 2019). We understand learning based upon Learning Compass 2030 as a positive pedagogically based process that needs permanently developing -transformative- skills partly for the sake of thriving and being equipped for coping with the occurrence of mental illness. In this function, he or she is in contact with

a wide range of actors, but teachers have a major role to play in developing a process of active and responsible learning (Furlong, 2008).

The well-being of both sides of the learning-teaching process - teacher and pupil - is essential, and as Borbath's (2019) study has shown, the mental health of female teachers, with the well-developed professional personality of the teacher is essential.

We know from several studies that the role of the teacher in the school world is crucial, and the main factor influencing the effectiveness of education, including the development of transformative competencies, which shows the quality of the teacher's work (McKinsey, 2007). As studies (Bhushan, 2012, Zsolnai, Szabó, 2020, Wang, 2022) explained that teachers' and students' emotional states are closely linked, it is easily understandable, -as the study described above has shown- that the teacher's mental health is one of the keys to the well-being of the two agents of the learning-teaching process. Thus, we state that teachers' and students' active and conscious role in shaping their well-being is essential for the sake of mentally also healthy, positive schooling in the 21st century.

The limitations of our study are the following: due to limited access, we were only able to include a restricted range of relevant studies in our literature review.. Also, we decided the main field connected to well-being in school according to the priorities of the school system in Hungary, may some areas remain unmentioned. In the future, it is worth conducting the study using content analysis software on a large database to get a more accurate picture of the area that we have been studying.

As some practical recommendations for schools we suggest, that Schools should look at how they can create a mutually reinforcing sense of well-being for pupils and teachers, as this is what makes school work feel good, as well as being effective and efficient.

Furthermore, we conclude as a part of the theoretic implication that as a main finding in our study, the uniqueness of the interpretation of the concept of well-being in the Learning Compass. The main characteristics of this definition is a dynamic state: while investing in skills development in the present increases the chances of high levels of well-being in the future. This approach enriches the existing well-being concepts with an extra point of view in the personal development field. This view fits in the school field perfectly.

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Unlocking the Potential of Nigerian Schools through Effective Parental Involvement

Adesoji ONI•, Celestina OSUJI••

Abstract

Education is pivotal to societal development and individual achievement, requiring cooperation among stakeholders, especially parents. This study investigates the role of parental involvement in promoting effective school administration in Lagos District IV, which includes Surulere, Mainland, and Apapa. A descriptive survey design was adopted, and data were collected from 132 respondents; students, teachers, school administrators, and parents, using structured questionnaires. Analysis through Pearson's Product Moment Correlation Coefficient revealed significant links between parental involvement and key aspects of school success, including student academic performance, discipline, and administrative effectiveness. The findings indicate that schools with active parental engagement benefit from improved governance, better student outcomes, and enhanced discipline. However, challenges such as socioeconomic constraints and poor communication hinder greater involvement. To address these, the study recommends implementing structured parental participation programs, increasing government support, and tackling cultural and linguistic barriers. Ultimately, the study underscores the critical role of parental engagement in driving effective school management and achieving improved educational outcomes, highlighting the need for collaborative strategies to overcome existing challenges and fully harness the potential of parental contributions.

Keywords: Parental involvement, school administration, academic performance, school governance, Nigeria, educational outcomes.

Introduction

Education serves as a cornerstone for societal advancement and individual success. However, achieving optimal educational outcomes is a collective responsibility that requires the active participation of parents, educators, and policymakers. Among these

• Department of Educational Foundations, University of Lagos, Akoka, Lagos. aoni@unilag.edu.ng
http://orcid.org/0000-0001-6774-2672

•• Department of Educational Foundation, Federal University Gusau, Zamfara State, Nigeria,
celestinaosuji@fugusau.edu.ng   https://orcid.org/0009-0002-9828-9414

key stakeholders, parental engagement is increasingly recognized as a pivotal factor in enhancing student performance and improving school management.

Parental involvement, as defined by Epstein and Sheldon (2016), encompasses a wide range of activities that parents engage in to support their children's educational journey. These activities include offering both material and emotional support, as well as participating in school governance and events. The nature of the parent-child relationship is crucial in shaping a child's academic achievements and overall well-being.

The importance of parental involvement has garnered significant attention worldwide, with studies consistently highlighting its positive impact on both student outcomes and school governance. For instance, Harris and Goodall (2021) found that schools with high levels of parental engagement tend to experience better academic performance and more effective school management. The European Commission has underscored the importance of parental participation as a vital indicator of quality in education (Borgonovi & Montt, 2012). In countries such as the UK, policies have been implemented to encourage stronger parental involvement, including improved communication strategies, amplifying parental voices, and cultivating strong school-family partnerships (Desforges & Abouchaar, 2022).

Parental engagement has become a cornerstone of effective school administration, providing multiple benefits to educational institutions. It creates a collaborative atmosphere where schools and families join forces to meet shared goals. Harris and Goodall (2021) argue that this partnership not only boosts academic outcomes but also strengthens school governance. Parental involvement can be seen in various forms, such as active participation in Parent-Teacher Associations (PTAs), contributions to school resources, and engagement in decision-making processes. Schools that enjoy strong parental support typically benefit from better resource management, enhanced communication, and increased trust among stakeholders, all of which contribute to a more conducive learning environment and institutional growth.

In Nigeria, parental involvement has proven to be a key factor in improving educational standards. Oduolowu and Olowe (2020) highlight the significant role of PTAs in Lagos, where they help fund crucial projects, address infrastructure challenges, and support staff welfare. Additionally, Epstein and Sheldon's (2016) model of parental involvement emphasizes its role in bridging the gap between schools and their communities. By involving parents in administrative functions, schools can enhance transparency and mutual accountability, fostering a well-managed and disciplined learning environment. These findings underscore the idea that parental involvement is not just an added benefit, but a core component of effective school administration and the achievement of positive educational outcomes.

Beyond supporting student learning, parental involvement contributes to a collaborative governance framework that enhances school management. When parents are involved in decision-making processes, it promotes a more inclusive and transparent school culture, improving organizational efficiency (Shah, 2022). Parental participation

may take the form of active roles in PTAs, school boards, and committees focusing on areas like school development, safety, and resource allocation. Hoover-Dempsey et al. (2021) observe that schools that engage parents in administrative and policy decisions often experience better resource management and a more supportive school environment. Furthermore, parental involvement in governance roles ensures accountability, making sure that school decisions align with the community's educational objectives and values.

Another important aspect of parental engagement is its influence on the emotional atmosphere within schools. Parents who actively participate in school activities and collaborate with educators help foster a positive school culture characterized by respect, cooperation, and motivation (Wang & Sheikh-Khalil, 2020). Their involvement boosts teacher morale, as educators feel more supported and valued by the community. Baker et al. (2023) suggest that engaged parents can also reduce behavioral issues among students, contributing to a more favorable learning environment. Additionally, a positive emotional climate, reinforced by parental engagement, enhances students' social-emotional learning and strengthens the connection between home and school. In resource-constrained environments like Nigeria, parental support can be transformative by addressing infrastructure deficits, improving teacher welfare, and ensuring better school discipline (Adepoju & Omolara, 2022).

In the Nigerian context, the significance of parental involvement is evident through the active participation of Parent-Teacher Associations (PTAs), which have played a critical role in enhancing school facilities, recruiting additional staff, and promoting community involvement in school management. However, challenges such as socioeconomic disparities and communication barriers between parents and school administrators remain (Oduolowu & Olowe, 2020). This study explores the influence of parental involvement on effective school administration in Lagos Education District IV, Nigeria, examining how parental engagement impacts student performance, discipline, and overall school governance. This research is particularly relevant in Nigeria, where the education system faces significant challenges related to student outcomes, discipline, and management (Oni, 2020). Despite the recognized importance of parental involvement in educational improvement, there is limited research on its role in shaping school administration in Nigeria. This study aims to provide a comprehensive understanding by incorporating perspectives from both teachers and students, offering a holistic view of how parental involvement affects school management and the educational experience. Furthermore, the findings aim to contribute to the ongoing discourse on educational reforms in Nigeria, where community support for school activities is increasingly acknowledged as vital to the success of the education system (Babalola, 2020).

Literature Review

Parental engagement in education has long been identified as a significant contributor to student success. Studies consistently demonstrate that when parents actively participate in their children's education, students tend to perform better academically, show improved behavior, and develop higher aspirations (Jeynes, 2012). Additionally, parental involvement in school activities is often linked to greater student engagement and a heightened sense of belonging (Desforges & Abouchaar, 2003). This involvement can manifest in various forms, such as attending Parent-Teacher Association (PTA) meetings, participating in school events, or contributing to decision-making processes related to school management. The degree of parental involvement frequently correlates with the perceived effectiveness of the school's management and the overall quality of the educational environment (Epstein, 2018).

Recent research has also explored the influence of parental participation on school discipline. According to Kim and Hill (2015), there is an inverse relationship between parental involvement and disciplinary problems in schools, with students whose parents are engaged in their education demonstrating better behavior and adherence to academic standards. Moreover, when parents participate in school activities, it fosters stronger connections between students, teachers, and school administrators, which contributes to a more positive and productive learning environment (Hill & Tyson, 2009). A strong partnership between home and school creates a unified approach to discipline, reinforcing academic expectations and behavioral standards.

The role of parents in shaping the school environment is also vital for effective school management. Cotton and Wikelund (2012) argue that schools with strong parental relationships tend to exhibit better organizational structures, higher teacher morale, and improved student outcomes. Parental involvement provides valuable feedback on the school's strengths and areas that need improvement, facilitating a more collaborative approach to addressing challenges. Schools that incorporate parental input into their decision-making processes are generally more responsive to the needs of the community, fostering greater trust and satisfaction among both parents and students (Henderson & Mapp, 2002).

This study seeks to expand on the existing literature by examining the relationship between parental involvement and school administration within the context of Nigerian education. With growing evidence that parental participation positively influences academic performance and school discipline (Ng, 2018), this research will offer valuable insights into how these factors intersect in Nigerian schools. By exploring the perspectives of both teachers and students on the role of parental involvement, this study aims to provide practical recommendations for enhancing school management through strengthened parent-school partnerships. The findings are particularly pertinent given the ongoing educational reforms in Nigeria, where addressing issues such as discipline, academic achievement, and effective management is crucial for achieving sustainable educational outcomes.

Statement of the Problem

While the importance of parental involvement in education is widely acknowledged, many Nigerian schools encounter difficulties related to insufficient parental engagement. Issues such as lack of monitoring of students' academic progress, limited participation in school activities, and various socioeconomic barriers contribute to this problem. This study seeks to investigate how parental involvement affect school administration in Lagos education District IV and identify strategies to enhance these relationships for better school management and improved student outcomes.

Purpose of the Study

This study seeks to explore how parental engagement influences the efficient management of schools in Lagos, Nigeria. The research is designed to specifically investigate how:

1. Determine if parental involvement affect students' academic performance.
2. Investigate the relationship between meeting children's needs and effective school management.
3. Assess the influence of parental involvement on school discipline.
4. Examine the extent to which schools incorporate parents in their administrative processes.

Research Questions

The following research questions will guide this study:

1. How do parental involvements affect the academic performance of students?
2. What is the relationship between parental involvement and school discipline?
3. To what extent do parental involvements influence effective school management?
4. How do schools in Lagos District IV incorporate parents into their administrative processes?

Hypotheses

The following hypotheses will be tested in this study:

1. There is no significant relationship between parental involvement and students' academic performance in senior secondary schools.
2. There is no significant relationship between parental involvement and discipline in the schools.
3. There is no substantial connection between parental participation and efficient school administration.
4. There is no incorporation of parents into the administrative processes of schools in Lagos District IV.

Methodology

This research employed a descriptive survey design to explore the connection between parental involvement and effective school management in Lagos, Nigeria. The descriptive survey approach was chosen for its ability to systematically gather and analyze participants' behaviors, attitudes, and opinions within their natural environments. This methodology enabled the researchers to identify relationships between the independent and dependent variables, while providing a thorough analysis of the research problem. The design was particularly fitting for this study, as it aimed to describe the current state of parental involvement and its impact on school administration, without manipulating the variables. Additionally, it allowed for the collection of quantitative data from a large sample, facilitating generalization of the results.

The study identified two primary categories of variables:

1. Independent variable. Parental involvement, which encompasses activities such as:
    a. Participation in school events and functions
    b. Support for students' academic needs
    c. Engagement in school governance
    d. Contributions to school development efforts

2. Dependent variables. These include:
    a. Student academic performance. The impact of parental involvement on student outcomes.
    b. School discipline. The relationship between parental engagement and school discipline.
    c. Effective school administration. The influence of parental contributions to school decision-making, resource management, and support for school initiatives.

The study hypothesizes that stronger parental involvement will positively influence school administration, resulting in improved academic performance, enhanced discipline, and more effective school management. This conceptual framework is supported by existing literature (e.g., Epstein & Sheldon, 2016; Harris & Goodall, 2021), which highlights the importance of parental engagement for educational success.

The study's population included parents, teachers, school administrators, and students from public secondary schools in Lagos Education District IV, which comprises the local government areas of Surulere, Mainland, and Apapa, and includes 58 public junior and senior secondary schools.

A random sampling method was applied to select six public secondary schools, ensuring representation from each local government area. The sample included:

- Students: 90 participants, balanced by gender (56% female, 44% male).
- School Administrators: 12 principals and vice-principals.
- Teachers: Six subject teachers (English and Mathematics) from the selected schools.
- Parents: 24 parents involved in school-related activities.

Data were collected using a structured questionnaire designed for four groups of respondents: principals, teachers, parents, and students. The questionnaire was divided into two sections:

- Section A. Demographic information of participants.
- Section B. Fifteen items aimed at capturing perceptions of parental involvement and its effects on school administration.

The instrument underwent expert validation and was tested for reliability using the test-retest method, achieving a reliability coefficient of 0.71, indicating sufficient reliability.

To collect data on key variables such as socioeconomic background, parental involvement, student performance, teacher practices, and engagement, structured questionnaires were developed for each group. The parent questionnaire measured socioeconomic status (SES) based on education, occupation, and income, as well as parental involvement and satisfaction with the school environment. Likert scales and composite indices were used for operationalizing these concepts. The student survey focused on academic performance (self-reported grades), engagement in learning activities, and attitudes toward education, with responses aggregated into average scores or indices. Similarly, the teacher questionnaire assessed classroom practices, perceptions of student behavior, and academic support, with responses scored on Likert scales to create summary indices for each construct. Composite scores were calculated using weighting, averaging, and normalization techniques to ensure comparability across variables.

To ensure the reliability and validity of the instruments, pilot testing and internal consistency checks were conducted, with Cronbach's alpha values exceeding the 0.70 threshold. This rigorous approach to instrument development ensured that the scales accurately measured the constructs under investigation, allowing for in-depth analysis of the relationships among family background, school context, and student outcomes. The calculated indices facilitated comparisons between respondents, such as correlating parent responses with their child's academic performance and the corresponding teacher's classroom practices, providing a comprehensive view of how these factors interact.

The data collection process involved obtaining responses from three key stakeholders—parents, teachers, and students—from the same school. This approach was designed to ensure that the responses were aligned and correlated, allowing for a comprehensive understanding of the dynamics influencing student outcomes:

1. Parent responses. Each parent who participated was directly linked to their child in the school. A structured questionnaire collected data on the parents' socioeconomic background, their involvement in their child's education, and their perceptions of the school environment. Unique identifiers were used to link each parent's responses to their child's academic performance and behavior, ensuring a direct connection.

2. Student responses. Students completed surveys or assessments that measured their academic performance, attitudes toward learning, and engagement. These instruments were tailored to be age-appropriate and aligned with the study's objectives. Data from students were linked to their respective parents and teachers using a unique coding system to maintain the integrity of the correlations.

3. Teacher responses. Teachers provided data on their classroom practices, perceptions of student behavior, and observations of student academic progress. Teachers were asked to focus on individual students within their class, allowing their responses to be matched with the corresponding students and their parents.

To ensure that the data from parents, teachers, and students were connected, each student was assigned a unique code, which was also linked to their parent and the teacher responsible for their class. This system enabled direct correlation between:

- A parent's involvement and perceptions with their child's academic outcomes.
- A teacher's observations and classroom practices with the performance and attitudes of the students.

This structured approach facilitated a thorough analysis, ensuring that the data were comprehensive and reflective of the interactions and relationships among stakeholders within the same educational setting. By linking these data points, the study aimed to gain deeper insights into how parental, teacher, and student dynamics contribute to educational outcomes.

Data were analyzed using both descriptive and inferential statistics. Percentages were used to summarize demographic characteristics and responses to research questions, while Pearson's Product Moment Correlation Coefficient was employed to test the three hypotheses at a significance level of 0.05. This statistical method was chosen to assess the strength and direction of the relationship between parental involvement and the dependent variables.

The research design was carefully crafted to provide a solid framework for examining the influence of parental involvement on school administration. By utilizing a descriptive survey approach, the study ensured a comprehensive understanding of the relationships between parental engagement and key educational outcomes. The integration of validated instruments, rigorous sampling methods, and robust statistical analyses further enhanced the reliability and validity of the study's findings.

Results
Participants
Table1
Distribution of Teachers According to Sex

Sex	Frequency (N)	Percentage (%)
Male	10	42%
Female	14	58%
Total	24	100%

Table 1 shows that the majority of the teachers are female (58%), while 42% of the teachers are male.

Table 2
Distribution of Parents According to Sex

Sex	Frequency (N)	Percentage (%)
Male	5	28%
Female	13	72%
Total	18	100%

Table 2 shows that the majority of the parents who responded to the questionnaire are female (72%), while only 28% of them are male.

Table 3
Distribution of Students According to Sex

Sex	Frequency (N)	Percentage (%)
Male	40	44%
Female	50	56%
Total	90	100%

Table 3 shows that the majority of the students are female (56%), while 44% of the students are male.

Table 4
Distribution of Teachers and Parents According to Age

Age Group	Teachers (N)	Teacher Percentage (%)	Parents (N)	Parent Percentage (%)
25-30	7	29%	0	0%
31-35	7	29%	11	61%
36-40	10	42%	7	39%
40 & Above	0	0%	0	0%
Total	24	100%	18	100%

Table 4 shows the distribution of teachers and parents according to age. The majority of the teachers (42%) fall within the 36-40 age range, while most of the parents (61%) fall within the 31-35 age range.

Table 5
Distribution of teachers and Parents according to Marital Status

Marital Status	Teacher	Percentage	Parent	Percentage
Single	0	0	0	0
Married	24	100%	18	100%
Total	24	100%	18	100%

Table 5 revealed that all the teachers and parent were married and are still together.

Analysis of Research Questions

Research Question Four: How the school does incorporate parents in it administration?

Table 6

Principal and Teachers Responses on parents' incorporation into administration

S/N	ITEMS	SA%	A%	D%	SD%	Total
11	Parent's participation in the school activities enhances the school	9(38)	12(50)	3(13)	0(0)	24(100)
12	Parental donation towards the school development promotes school administration.	7(29)	13(54)	4(17)	0(0)	24(100)
13	Principal's leadership style determines parent's involvement in the school's administration.	6(25)	16(67)	2(8)	0(0)	24(100)
14	Parent's involvement in the school administration boosts the morale of the students.	7(29)	15(63)	2(8)	0(0)	24(100)
15	Parents are always enthusiastic in responding to solving their children's school challenges.	4(17)	13(54)	7(27)	0(0)	24(100)
		33(28)	69(58)	18(15)	0(0)	120(100)

Note: SA% (Strongly Agree): Percentage of respondents who strongly agree with the statement, A% (Agree): Percentage of respondents who agree with the statement, D% (Disagree): Percentage of respondents who disagree with the statement, SD% (Strongly Disagree): Percentage of respondents who strongly disagree with the statement

Table 7

Student Responses on parents' incorporation into administration

S/N	ITEMS	SA%	A%	D%	SD%	Total
11	My parents always attend PTA meetings	38(42)	37(41)	9(9)	7(8)	90(100)
12	My parents always attend our school open day.	30(33)	44(49)	9(10)	7(8)	90(100)
13	My parents donate generously to he school.	16(18)	13(14)	35(39)	26(29)	90(100)
14	Attitude of my parents to the teacher affects me in the school	7(8)	9(10)	29(32)	45(50)	90(100)
15	I am always happy when my parents visit my school.	50(56)	34(38)	3(3)	3(3)	90(100)
		141(31)	137(30)	84(19)	88(20)	450(100)

Note: SA% (Strongly Agree): Percentage of respondents who strongly agree with the statement, A% (Agree): Percentage of respondents who agree with the statement, D% (Disagree): Percentage of respondents who disagree with the statement, SD% (Strongly Disagree): Percentage of respondents who strongly disagree with the statement

Analysis of Hypotheses

1: There is no significant relationship between parental involvement and academic performance of students in school.

Table 8

Correlation Computation on the Relationship between Parental involvement and Academic Performance of Students

Variable	Mean	df	P	r-cal r	r-critical	Decision
Parental involvement	24.7	130	0.05	0.978	0.195	Rejected
Academic performance	37.2					

Note: Significant at 0.05, df = (N-2) = (132-2) = 130

The computed correlation coefficient (r) of 0.978 exceeds the critical table value of 0.195 at a 0.05 significance level. Consequently, the null hypothesis, which posited no significant relationship between parental involvement and students' academic performance in school, is rejected. This indicates a significant relationship exists between parental involvement and students' academic performance in school.

2: There is no significant relationship between parental involvement and discipline of a school

Table 9

Correlation Computation on the Relationship between Parental Involvement and Discipline

Variable	Mean	df	P	r-cal	r-critical r	Decision
Parental involvement	24.7					
		130	0.05	0.778	0.195	Rejected
Discipline	18.3					

Significant at 0.05, df = (N-2) = (132-2) = 130

As shown in Table 9, the Pearson product-moment correlation coefficient is 0.778, which surpasses the critical table value of 0.195 at a 0.05 significance level. Therefore, the null hypothesis asserting no significant relationship between parental involvement and school discipline is rejected. This indicates that a relationship exists between parental involvement and the discipline within schools.

3: There is no significant relationship between parental involvement and effective school management.

Table 10 reveals a Pearson product-moment correlation coefficient of 0.866, which exceeds the critical table value of 0.195 at the 0.05 significance level. Consequently, the null hypothesis, which suggested no significant relationship between parental involvement and effective school management, is rejected. This indicates a significant relationship exists between parental involvement and effective school management by principals.

Table 10

Correlation Computation on the Relationship between Parental Involvement and Effective School Management

Variable	Mean	df	P	r-cal	r-critical	Decision
Parental Involvement	28.7					
		130	0.05	0.866	0.195	Rejected
Effective School Management	26.5					

Note: Significant at 0.05, df = (N-2) = (132-2) = 130

This study investigated the relationship between parental involvement and effective school administration in public secondary schools within Lagos State, Nigeria. The findings, detailed in Table 10, reveal a strong and statistically significant correlation (Pearson correlation coefficient = 0.866) between parental involvement and effective school management, surpassing the critical value of 0.195 at a 0.05 significance level. Consequently, the null hypothesis, which stated that no significant relationship exists between these variables, was rejected. The results indicate that active parental involvement is strongly associated with the effective administration of schools.

Discussion

The study confirmed a significant positive relationship between parental involvement and school management, aligning with contemporary research. Current literature emphasizes that parental engagement not only improves student academic performance but also supports effective school governance and decision-making. For instance, researchers like Epstein (2018) and Goodall & Montgomery (2014) highlight that schools where parents are actively involved tend to have stronger governance structures and improved student outcomes.

This aligns with the earlier work of Mabasa & Themane (2002), who observed that principals and teachers often dominate school governing boards, leaving little room for parental input. However, the current study suggests that schools that engage parents meaningfully in decision-making processes experience better administrative outcomes.

Parental involvement also has direct implications for student behavior, as Oshungbohin (2001) noted in her study, where children from broken homes or those lacking parental guidance were more likely to exhibit behavioral issues such as drug addiction and violence. The findings from the current research further reinforce this by

showing that parental involvement contributes to both school discipline and overall academic achievement.

The research also highlights challenges such as parents' lack of confidence in participating in school governance due to language barriers or low educational qualifications (Karlsson, 2002). This suggests that schools need to provide resources and support to empower parents to actively engage in their children's education, fostering a more inclusive and effective school environment.

Conclusion

This research underscores the crucial role of parental involvement in improving school administration effectiveness in Nigeria. Evidence shows that parental engagement enhances student performance, discipline, and overall governance within schools. In Lagos District IV, schools that nurture strong relationships with parents are likely to experience better academic results and more effective management. Overcoming challenges to parental participation, such as socioeconomic inequalities and communication issues, is vital for fostering a more cooperative and supportive educational atmosphere.

The study illustrates that parental involvement is key to effective school management and student achievement. In schools where parents actively participate in governance and decision-making, students generally perform better, and the overall school environment is more favorable for learning. The findings reinforce the idea that successful school administration hinges on collaboration between educators, parents, and students.

However, the study also highlighted obstacles to parental involvement, such as low educational levels and language barriers, which need to be addressed in order to maximize the advantages of parental participation. Overcoming these challenges will require coordinated efforts from school leaders, teachers, and policymakers to cultivate more inclusive and supportive settings that encourage greater parental engagement

Recommendations

Based on the findings of this research, the following recommendations are proposed to enhance school administration effectiveness and boost student outcomes through increased parental involvement in Lagos, Nigeria:

Enhance parent-teacher collaboration. Schools should create more consistent and structured opportunities for parents to engage in school activities, such as regular PTA meetings and school open days. This will improve communication between parents and teachers, fostering a stronger partnership in student development. Efforts should be made to increase parental participation in decision-making, with a focus on inclusive

leadership that encourages parents to play an active role in both academic and administrative functions.

Encourage parental support for school discipline. Considering the positive link between parental involvement and school discipline, schools should introduce initiatives that motivate parents to actively support discipline policies. These could include workshops or seminars educating parents on reinforcing school discipline at home and maintaining consistent expectations. Additionally, schools should provide regular updates to parents on their children's behavior and academic progress.

Incentivize parental contributions to school management. Schools should acknowledge and reward parents who actively contribute to the school's administration, whether through financial donations or volunteer work. Public recognition of these contributions will encourage greater involvement from other parents. Furthermore, school management should ensure that parents feel valued by involving them in governance and resolving school-related issues through feedback channels and advisory committees.

Develop programs for socioeconomically disadvantaged parents. To address the socioeconomic challenges that hinder parental involvement, schools should design specific initiatives that tackle these barriers. For instance, offering flexible meeting times and virtual participation options would make it easier for parents facing financial or logistical difficulties. Schools could also provide support services such as parenting workshops to guide parents on how to help their children succeed academically, even in challenging circumstances.

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