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Teachers' Beliefs on Moral Development in Hungary - with Reference to Children with Mild Intellectual Disability

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Abstract

The aim of our research was to find out teachers', lower primary school teachers', and special education teachers' beliefs of moral development with a special focus on children with mild intellectual disabilities. We also look at the perceptions of candidates studying on the same subjects. Numerous research studies show that teachers' educational beliefs having significant impact on the educational process. This paper presents the qualitative part of a mixed method research. Semi-structured interviews (N=13) and one focus group discussion (N=1) were used. Interview respondents reported that they found it difficult to define moral behavior because it is situational. We found that among the factors influencing moral development, family background plays the strongest role, but they also feel their own responsibility is paramount. Opinions on the moral development of children with mild intellectual disabilities are varied. The main tendencies are that some say that they cannot reach the same level of development as a typically developing children, and some say that IQ should not be a barrier. And, according to some, moral development may be also atypical. We found interesting correlations between the views of teachers in the field and those of candidates.

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INTRODUCTION

"No one is good by accident. Virtue must be learned" (Seneca, 1975, p. 89). Although a long time has passed since Seneca's words, in the 20th century researchers (Piaget, 1965; Kohlberg, 1976; Gilligan, 1982; Rest et al., 1978, Lind, 2016) have taken a similar view of morality: moral behavior is not innate but learned. Without moral conduct, human communities cannot develop, and if it is lacking, it causes disruption in the functioning of the community. Therefore, if an individual's behaviour is not characterised by moral forms of conduct and action, it is usually sanctioned by society (Bábosik, 2004). So by supporting the development of moral sense, we are ultimately supporting the well-being of the individual within the community. In 2021, children with mild intellectual disabilities represented the second largest disability group in the public education system in Hungary. Their number in this school year was 14323, and 35.55% of them were studying in integration with typically developing peers (Hegedűs, 2023). Children with mild intellectual disabilities are therefore also appearing in large numbers in the education system. It would be worthwhile to place greater emphasis on sensitisation in teacher training. It is important to examine the role of institutional education in the development of moral sense, the impact of teachers' views and beliefs on this area. How do they see their own role in the process of promoting moral development? How do they see the development of this area being guided in a positive direction? Before we look for answers to these questions, we need to ask one more: why do we think these are relevant questions? We will try to answer in the theoretical framework below.

THEORETICAL FRAMEWORK

Teachers' beliefs

Beliefs are assumptions about the world that we believe to be true, but are not based on scientifically proven knowledge. Views can be seen as cognitive constructs that influence our judgements and decisions (Richardson, 1996). Educators have a set of views that influence their everyday practice. These beliefs also influence further knowledge acquisition and teaching practice (Falus, 2003). Pajares (1992) argues that teachers' beliefs should be a focus of pedagogical research. In a Finnish qualitative case study (Rissanen et al., 2018), the authors investigated the impact of implicit theories in the moral science teaching practice of four teachers. Implicit theories do not stand alone, but are networked with other dominant beliefs. These networks of beliefs form a structured system of meanings that guide the way people understand themselves and others and make sense of their social experiences. Implicit theories influence how teachers make sense of social phenomena in the classroom, as well as their pedagogical decisions. The authors hypothesized that teachers' implicit theories, and the subtle cues they continually convey, influence their efforts to develop moral sense. Their results show that teachers' implicit beliefs are communicated to students in a variety of ways and influence teachers' interpretations and efforts to develop students' ethical sense. The study suggests that implicit theories represent an important construct in moral education research that has been missing from the related literature.

Teachers' educational beliefs are internal structures having significant impact on the educational process (Nahalka, 2003). Their quality is influenced by the patterns they are based on and the pedagogical knowledge that underlies them (Kojanitz, 2019). Research by Whitley et al. (2019) shows that there is a direct link between teachers' beliefs and the process of effective teaching-learning. Lénárd and Szivák (2001) investigated pedagogical beliefs and their impact on the overall educational process, in hungarian context. It was researched the characteristics and content of views on education. Teachers felt that the most important aspect in defining education was the transmission of moral norms. According to the interviewees, the most educational effect they can achieve is through their own personality and setting a personal example. However, interviews in Lénárd's (2003) related research showed that a significant proportion of the teachers interviewed delegated the responsibility for education. In their view, school is responsible for the conscious acquisition of the knowledge necessary for future independent living, but the family, as the primary socialisation arena, is responsible for educational tasks such as the acquisition of social norms and the development of

general human values. According to Durmus's article (2019), based on a small qualitative study in Turkey, highlights the dilemma, especially for beginning teachers, of whether to focus on academic achievement or moral education. The research revealed that the teachers involved were particularly concerned that parents were deliberately raising their children to be selfish in the hope for future success, and that they saw the values of tolerance, kindness, justice and honesty being taken out.

Students with intellectual disability – and teachers' attitudes towards them

Attitudes towards people with disabilities are complex and multifaceted, but there is a tendency for non-disabled people to have negative attitudes towards people with disabilities (Dunn, 2015; Castillo & Larson, 2020). The average person is more accepting of physical disabilities than mental disabilities (Dunn, 2015), the latter category including intellectual disability. In the DSM–V (2014), intellectual disability is included in the major group of neurodevelopmental disorders. Three criteria must be met for a diagnosis. The first criterion is impairment in intellectual functioning (reasoning, problem solving, planning, abstract thinking, judgment, school learning and learning from experience), as confirmed by clinical assessment and individually recorded intelligence test. The second criterion is impaired adaptive functioning, which impairs personal independence and social responsibility. The third point is that both intellectual and adaptive disorders begin during the developmental period. These individuals are characterised by significant impairments in intellectual-cognitive functioning and adaptive behavior, which are compared to the peer group. Even the most severe manifestations of intellectual disability do not call into question the status of the individuals concerned. Persons with intellectual disability represent a possible variant of human existence and can be divided into four categories: mild, moderate, severe, and very severe (Lányiné, 2009; 2017). According to the consensus view of educational science and special education, the possibility of educability is given for children with intellectual disability (Mesterházi & Szekeres, 2021).

Teachers' views of person with disabilities can determine students' attitudes toward people with disabilities and how they will behave toward them in the future (Allan, 1999). In classrooms where teachers are prejudiced against people with disabilities, the integration of students with special needs is less successful. Educators who believe that abilities are difficult to influence through learning and practice, and who prefer to view them as stable, fixed characteristics of children, are less likely taking responsibility for working with students living with disabilities (Glenn, 2018).

The attitudes of Hungarian teachers towards students with disabilities often contain negative elements, which further reinforces prejudiced attitudes and behavior (Jászi, 2013). The majority of teachers are skeptical about integration efforts and their attitude towards integration is ambivalent (Pénzes, 2008). A recent Hungarian study explored teachers' views on persons with disabilities and their social situation, using metaphor analysis. In the data collection and analysis, different disability groups were not treated separately, which is a limitation of the research. The majority of the teachers participating in the research view the disabled person as a person in need of care and for whom they feel responsible. However, their perception of their social situation is characterised by exclusion, vulnerability and marginality. In their view, inclusion of people with disabilities is not achieved at the societal level (Gulya, Vajnai & Szabó, 2023).

What do we know about moral development since Piaget and Kohlberg, and what do we know about the moral sense of people with intellectual disability?

According to Jean Piaget and Lawrence Kohlberg, moral development is a process of relativisation, so the higher one is in moral development, the more one is able to take intention and circumstances into account when making judgements. Both theorists agree that morality can be taught. The difference is that Piaget (Piaget & Inhelder, 2004) believed that we are close to the peak of moral development by the age of 10, whereas Kohlberg (1976) believed that this development lasts until around 16–17 years of age. Since the pioneering work of Piaget and Kohlberg, there have been many new developments. We cannot explain this in detail in this paper, but we will briefly summarise.

One of the best-known critics of Kohlberg's theory, the feminist Carol Gilligan (1982), argues for a qualitative difference between male and female morality. According to her, women's moral judgements are typically motivated by a desire for care and empathy, while men's decisions are generally rule-following. Gibbs (1992) described a model very similar to the Kohlberg approach, but with only four stages. Nucci and Turiel (1978) and Turiel and Banas (2020) draw attention to the importance of the social context that influences a given moral decision. Bloom (2010) developed a method (based on eye movement tracking) to assess the moral sense of children as young as 1 year old. His studies show that there is a spark of ethical sense as early as the first year of life. Damon (1977), Rest (1978), Lind (1978, 2016) and Khanam (2018) are researchers who use Kohlberg's staging of moral development as a basis and their new assessment instruments, similar to Kohlberg's procedure, map the respondent's moral judgement through the judgement of moral dilemmas.

To our knowledge, there is no studies have been conducted on the moral development of children with intellectual disabilities, but there is also very little research with adult participants. These are difficult to assess, as there are several in which the assessment was carried out using individually developed, non-standardised measures (Langdon et al., 2010). Langdon et al (2010) tested adults with and without intellectual disability using two measures. The average intelligence level of the 32 individuals with intellectual disability included in the study was IQ=59. The Socio-Moral Reflection Measure - Short Form (SMRM-SF) and the Moral Theme Inventory (MTI) were used in a test-retest situation, two weeks apart. The Moral Theme Inventory (MTI) was developed primarily for children, but there is also experience with adult subjects. The reliability of the MTI was low for subjects with intellectual disability, but the reliability of the SMRM-SF was found to be adequate for both the test and control groups. In the case of the MTI, it was described that individuals with intellectual disability had difficulty interpreting what they heard. The results measured by the SMRM-SF instrument showed that the test group was at one level lower of development of moral judgement compared to the control group. This is the second level according to Gibbs (1992). This level is characterised by instrumental morality and the exchange principle, similar to Kohlberg's (1976) second level. The exchange principle is to give as much as you get (an eye for an eye, a tooth for a tooth), while instrumental morality is to accept the exploitation of others for one's own ends. At the third level, our moral judgements are governed by the golden rule of "treat others as you would like to be treated". The authors conclude that the differences between the two groups can be explained by intellectual differences (Langdon et al., 2010).

In another Dutch study (Van Vugt et al., 2011), the SMRM-SF measure was also used to assess the level of moral judgement in juveniles (under 16 years) who had committed a sexual offence. The test group included 32 offenders who had borderline intelligence levels, IQ between 57 and 84. The control group consisted of 45 juvenile offenders who were not affected by intellectual disability. The participants with intellectual disability were at the second level of moral development, similar to the results of Langdon et al. (2010). Those in the control group were in the transition zone between the second and third levels, i.e. slightly higher than the participants with intellectual disability.

Otrebski and Czusz-Sudoł (2022) investigated the moral sensitivity of people with intellectual disability and how this is related to the severity of intellectual disability and gender. The instrument they developed is the Moral Sensitivity Inventory (MSI), an instrument designed for people aged 16-30 years with mild to moderate intellectual disability, which measures moral sensitivity. It is administered in a face to face situation in which the test person does not have to read. The MSI consists of 10 stories with pictures that present typical moral dilemmas. The subject's task is to answer the question, "Who in this story did something right or wrong, and what was it?" Their study involved 267 Polish people aged 16-30 years with mild (58.42%) or moderate intellectual disability (41.58%). Men and women were almost equally represented. Women with mild intellectual disability were more sensitive to moral right and wrong in situations where they had to behave according to principles and norms. A greater number of people with mild intellectual disability in the study were able to recognise manifestations of moral right and wrong than participants with moderate intellectual disability. The difference between the mean scores of the two groups was statistically significant ($p \leq 0.001$), suggesting a correlation between the level of moral sensitivity and the severity of the intellectual

disability. The authors therefore suggest that cognitive development is one of the factors influencing moral sensitivity.

A BRIEF DESCRIPTION OF THE AIM OF THE RESEARCH

The aim of our research is to investigate teachers', lower primary school teachers', and special education teachers' beliefs of moral development with a special focus on children with mild intellectual disabilities. We also look at the perceptions of candidates studying on the same subjects. This paper presents the qualitative part of a mixed method research.

In Hungarian educational system lower primary school teachers have different competences from teachers. They teach specifically in the first four classes of primary school. A special education teacher is a professional with higher education qualifications who works with children and adults with disabilities. Their competence covers the care of the population group corresponding to their specialisation (Mesterházi, 1997), for example pedagogy of mild intellectual disability. Exploring the views of this target group, especially special education teachers and special education teacher candidates, specifically on moral education is a less researched area, so it is their views that add novelty to our approach. We also investigate their views on the moral development of pupils with mild intellectual disabilities. The inclusion of this aspect will, as far as we are aware, be a further innovation in both educational science and disability studies.

Research Questions

In this paper we aim to answer the following research questions:

Q1: What does moral behavior mean for groups of participants?
Q2: What are they beliefs on the factors that might develop moral sense?
Q3: What methods are considered appropriate for developing moral sense?
Q4: What do they think about the moral development of students with mild intellectual disabilitiy?

METHOD

We chose the semi-structured interview and focus group discussion, because these methods offer an opportunity to explore opinions and views in more depth and to present aspects that we had not previously thought of. The framework of the semi-structured interview was the most appropriate for our research. We have the interview plan of what questions we intend to ask, but during the interview we have the possibility to deviate from it, or to ask clarifying questions as needed (Rácz, 2023). This type of interview generates extensive and rich data from participants in the study (Howitt, 2016). The interview questions can be found in the Annex 1 and 2.

A focus group is a research method that uses data generated by participants communicating with each other about a particular topic. Focus refers to the fact that the discussion is organised around a central theme (Vicsek, 2006). The main characteristics of a focus group are: organised discussion, joint activity, social event, interaction (Gibbs, 1997, cited in Howitt, 2016). The interaction between participants can help to recall forgotten details. Listening to other members of the group may help them to recall content that they might have forgotten to mention in other circumstances (Merton, Fiske & Kendall, 1990). It may also allow participants to articulate aspects that they had not previously thought about in detail (Morgan, 1997). The focus group topics can be found in the Annex 3.

Sample

Participants were recruited by convenience sampling. The target groups and sample size are illustrated in Table 1 below. In total, 13 teachers and candidates were interviewed. In addition, one

focus group interview was made with 3 teachers. There are few men working as teachers in educational system in Hungary, so our sample is not representative of this aspect.

Table 1. Target Groups and Sample Size

The group of participants	Interview		Focus group	
	Men	Women	Men	Women
Lower primary school teachers	-	2	-	1
Teachers	3	-	-	1
Special education teachers	-	2	-	1
Lower primary school teacher candidates	-	2	-	-
Teacher candidates	1	1	-	-
Special education teacher candidates	-	2	-	-

Introduction of the Participants

Of the seven teachers interviewed who are already in the practice, three are men and four are women. Their ages range from 34 to 58, with an average age of 44. All of them are highly qualified teachers, with several degrees. The youngest teacher has been in the profession for 7 years and the oldest for 33 years. One teacher has a university degree in Ethics and one special education teacher has a 30-hour accredited course qualification, which, according to the regulations at the time, qualified her to teach Ethics. The others have no related qualifications, but it was found that two of them taught Ethics. In candidates' group, we interviewed five women and one man. Their ages range from 20 to 24 years, all of them are full-time students in Budapest.

The focus group interviews were made with a lower primary school teacher, a special education teacher and a leader of a temporary/crisis home. The teacher participant works in a lower primary school, and the special education teacher participant is in leader position. The head of the temporary/crisis home has several qualifications (inclouding teaching) and also works as a child psychodrama teacher, which makes her a really valuable addition to this research.

Procedure

Data collection took place between October 2022 and February 2023. The planned sample size was 12 interviews and 1 focus group interview. The cyber space made it possible to interview people with whom it would otherwise not have been possible to meet in person due to lack of time, distance or location. Interviews were organised either online or face to face, depending on the arrangements made. The focus group interview was conducted in personal form. In all cases, audio recordings were made with the participants' knowledge and consent. The audio recordings of the interviews and the focus group discussions amount to almost 12 hours in total. The experience was that interviews with candidates lasted about 30 minutes, while with teachers they took much longer, sometimes up to one and a half to two hours. The audio recordings were transcribed using the Alrite software, which was checked by listening back to the recordings.

For content analysis of the texts, we used the ATLAS.ti software. For networking purposes, the 13 interview and focus group discussion responses were treated as one corpus of data. The content analysis methodology was hybrid. It was deductive in the sense that there were codes and categories derived from the literature, but it also required inductively formulated codes that were associated with each segment while reading the text. In the "open coding" section, a total of 404 codes were inserted in the text. In the next stage, "axial coding", these codes were grouped into 11 categories. Logical relationships were defined between the codes in each category, which were finally assembled into conceptual networks. In each case, the networks have a core, a key concept around which the codes are organised.

RESULTS

It is not possible to present all the results in detail in this paper, but the following networks have been created by content analysis: moral development, moral behavior, who is responsible for developing, methods, question of measurement, Ethics education, the morality of our times, the morals of today's generation, views on the morality of children with mild intellectual disability, the challenge in education, and supporting factors. The last two networks was not anticipated but we present these in the discussion of the results, because they colour the picture of Hungarian educational system. Now, progress along our research questions.

Q1: What does moral behavior mean for groups of participants?

Interview respondents reported that they found it difficult to define moral behavior. Many concluded that moral behavior is situational, situation-dependent. Because moral behavior is *"I don't steal, but I would steal for my child."* One teacher argued that, in his view, it is not possible to describe someone by a stage of moral development (in the Kohlbergian sense) because *"we are all of us at the same time"* and it depends on the situation to which one's reaction corresponds. The link with conscience has been highlighted several times. Alongside or independently of this, respondents tried to define what moral behavior means to them. One of the answers that appeared most frequently was the ability to change your point of view and to help others, and to treat others as you would like to be treated.

Q2: What are they beliefs on the factors that might develop moral sense?

The following are the influences that teachers and candidates perceive as affecting children's moral development, either positively or negatively. From the interviews, it emerged that innate foundations are assumed, but a much more prominent role was attributed to learning, example-setting and nurture. The fact that the importance of institutional education was mentioned several times shows that, as educators or future educators, they also see it as their task to shape moral sense, but the role of the family as the primary socialisation arena was slightly more prominent. The important role of peers was mentioned almost as often as that of the family.

Q3: What methods are considered appropriate for developing moral sense?

During the interviews, the most frequently mentioned methods were role-playing and games, with a special focus on situational games. In addition, conflict management and the mediation role of teachers in this context were mentioned several times. Talking and related feedback on behavior, showing consequences were also a common response. Watching a film or listening to a story was also brought in by several respondents. Respondents affirm that the development of moral sense can be fostered through personal relationships and that this is optimally continuous and embedded in everyday life. There is also a place for structured sessions, specifically in group settings.

Q4: What do they think about the moral development of students with mild intellectual disabilitiy?

All the teachers interviewed, who are already in the field, have had contact with children with intellectual disabilities in the course of their work. Of course, the candidates of special needs education interviewed also have knowledge of this population. In contrast all the participant candidates indicated that they were not familiar with this group of children.

Overall, there are very different views on whether a child with mild intellectual disability can reach the same level of moral development as a typically developing child. Some believe that the development of moral sense is related to the level of intelligence, so that a child with mild intellectual disability remains at a lower level of moral development than his or her typically developing peers of the same age. In Kohlberg's terminology, the pre-conventional level is referred to, where external

control plays a role in guiding behavior. The other part of their argument was that moral development is not related to intelligence, that there is no difference between the morality of a child with mild intellectual disability and a typically developing child. Two other trends emerged. The first is that the development of moral sense depends on the individual (and personality is much more complex than being judged by a single factor such as intelligence level). The second is that in their case the path of moral development will be atypical.

Challenge in education and supporting factors

In the content analysis of the interviews, the categorisation of the codes resulted in two networks that were not expected. These were the difficulties and challenges that teachers face in their work and what supports their work. By their very nature, these were overwhelmingly provided by teachers already in the profession, but not exclusively.

In the context of the difficulties, the issue of career drop-outs and the resulting shortage of teachers was raised several times. A major difficulty is that *"there is no choice of teachers",* with heads of institutions having to take on anyone who applies. There are many older colleagues on the teaching staff with whom it is more difficult to find common ground. There are also concerns about the current education system. Of those interviewed, one career leaver decided to switch because of a lack of success, a feeling of inertia and ultimately burnout. As she put it, *"I didn't feel I could do anything meaningful for these children. Or, rather, that I was not providing them with what they needed."* And another interviewee is currently in the field but has worked in other fields before and may decide to do so again soon. One of the reasons he is considering a change is the lack of managerial and peer support. *"I treat children as individuals and measure them against themselves. But in this school, that's not what the others understand"* she says. Overwork and lack of financial and social esteem were other risk factors for burnout, as they also emerged in other interviews. In the interview with one teacher, this was compounded by unrealistic expectations of himself. *"...I could call it overwork, although I don't like that word, because I hope that I can't be overworked."*

The challenges at work are not positive. In the background, there is little sense of achievement, a feeling of helplessness, a lack of resources (*"I am not enough"*), inexperience. They feel that the negative impact of the media is significant, in particular the pornographic content freely available to children, and the lack of awareness of internet use and parental control. The lack of contact between school and parents and difficulties in communicating with parents were repeatedly raised. Problems at home and in the family are reflected at school, manifesting themselves in children's challenging behavior. There was talk of abuse and neglect. One teacher spoke of a frightening phenomenon he had been confronted with over the last few years. He called the children involved *"Euro orphans".* Their parents are in fact living abroad for work, but the children stay at home with elderly relatives or in hostel of the secondary school. Several of the interviewees reported that either their student had become a mother, or they were teaching a student whose mother had given birth as child, or had become a prostitute. They talked about poverty, parents who had become homeless, families living in maternity homes, and how they were able to work with and support children from such difficult backgrounds. The challenges faced by disadvantaged and Roma children were mentioned several times. Several said that there are great difficulties when there are differences between the expectations of the home as the primary socialisation arena and the school as the secondary arena. On the one hand, this creates frustration in children and on the other hand, they feel that school cannot modify existing patterns of challenging behavior. According to the teachers interviewed, teachers are hampered by a lack of balance, time, energy and opportunity in their work.

Among the factors that support their work, the fact that these teachers are at home in their workplace and enjoy working with children was repeatedly mentioned. They said: *"I' m very happy to go to work on Mondays, and every week I tried to organise some kind of programme that would make the children happy to go to school." "I' m so at home everywhere"* (he works multiple jobs). *"It' s nice to be around the students where I am."*

For most of the interviewees, it is their own professional development arc that supports their work. Gaining qualifications, completing new schools, being able to cope with a wide variety of tasks, positive challenges, practical experience gained, previous, formative work experience, volunteering; are they draw on meeting the challenges of everyday life.

Another supportive factor is a stable working environment, the presence of a good leader in the institution who supports teachers' freedom of choice in methodological matters. A significant factor is good relations with colleagues, who exchange experiences and share knowledge. It helps to have access to a school psychologist or to involve external supporters in the life of the school, who can offer something to the children, either by getting them involved in external programmes or by involving them in the life of the institution. Sport has also emerged as a tool to put children's development on a positive path. The relationship with parents appears as a supporting factor when it works well. Examples of positive use of media opportunities were also mentioned, although only in one case. Rather, they see it as a disadvantage and perceive it as a positive effect if there is the possibility to limit telephone use within an institutional framework.

They told us how they see a good teacher: a positive personality *("always focusing on the good")*. They focus on their strengths and do not spend their energy compensating for their weaknesses. She is flexible in her approach, strives for individual attention, tries to find a voice with children and takes responsibility for the children she works with. The positive feedback from children and the respect they show for teachers has also been supportive.

CONCLUSION

According to participants it is difficult to define moral behavior because it is situational. In terms of supporting the development of moral sense, although the primary role of the family is undeniable, both teachers and candidates interviewed show a high level of responsibility. Opinions on the moral development of children with mild intellectual disabilities are varied. Some believe that the development of moral sense is related to the level of intelligence, so that a child with mild intellectual disability remains at a lower level of moral development than his or her typically developing peers of the same age. The other part of their argument was that moral development is not related to intelligence, that there is no difference between the morality of a child with a mild intellectual disability and a typically developing child. In the content analysis of the interviews, the categorisation of the codes resulted in two networks that were not expected. These were the difficulties and challenges that teachers face in their work and what supports their work. These results are presented because they give a good picture of the Hungarian education system.

DISCUSSION

In relation to perceptions of moral behavior, it should be highlighted from the results that it is a difficult construct to define according to the participants. They believe that is considered moral behavior is highly situational and setting dependent. This result is consistent with the research of Piaget (1965) and Kohlberg (1976). According to both of them, moral development tends towards relativisation, i.e. the higher one's level of moral development, the more one is able to take intention and circumstances into account when making judgements.

Among the factors influencing moral development, the role of the family and parents stands out. This finding is in line with previous research by Lénárd (2003). They consider the role of role modeling, learning and education to be crucial, alongside which the expressed and implicit expectations of the contemporary group become more prominent over time. In terms of supporting the development of moral sense, although the primary role of the family is undeniable, both teachers and candidates interviewed show a high level of responsibility. Their activity is not linked to the Ethics

classroom, as illustrated in the interviews by the fact that moral education is *"in every time"* and that they do it during *"in their sleep".*

It was mentioned several times that they feel that the patterns brought from their family (and considered inappropriate) are difficult or impossible for the school to modify. We know from the literature about the difficulties caused by the discrepancy between the family and the institutional socialisation arena. Children take the patterns and values they bring from home for granted and these are part of their identity. When they are confronted with (sometimes extremely different) routines and expectations during institutional socialisation, defence mechanisms are triggered. The greater the difference between the two environments, the less bridging support, the greater the resistance. If the family world is devalued, it is traumatic for children. School socialisation can only be truly effective if it could build on primary socialisation and recognise its values. The key to effective pedagogical practice is that the institution makes an effort to learn about and understand children's world at home and tries to reduce the distance between them (N. Kollár & Szabó, 2017).

The most frequently mentioned methods to support the development of moral sense were talking, reading and storytelling, drama and role-play. It was reported that during discussion, the conclusion and the lesson is drawn by the children, which is in line with the recommendation: the teacher helps the pupils to conflict their views and does not want the participants to formulate a binding value system (Mihály, 2001; Szekszárdi & Tusa, 2006). The teacher tries to ensure that the pupils do not want to conform to his/her opinion, but can be discussed with him/her. The teacher tries to constantly make them aware that there is no wrong answer (Fenyődi, 2015).

In relation to the perceptions of the group of children with mild intellectual disability, it should be pointed out that during the interviews, teacher candidaetes (except for special needs teacher candidates of course) indicated that they were not familiar with the characteristics of this population. All those already in the field had experience with them, regardless of their educational background. We therefore think it would be useful to include this content in the courses. Opinions on the moral development of children with intellectual disabilities are varied. The main tendencies are that some say that they cannot reach the same level of development as a typically developing children, and some say that IQ should not be a barrier, so it is not a matter of IQ.

The content analysis of the interviews produced two networks that we did not expect. These are challenge in education and supporting factors. We thought it important to present them, because they represent the state of the Hungarian education system.

Limitations

The sampling was access-based, with small patterns, so we cannot draw general conclusions. In this phase, we wanted to explore what we could expect from the target groups' responses. Next step, we will be able to compile a questionnaire based on the responses, which could provide a more nuanced picture on a larger sample. The participants in the interviews and focus group discussion influenced by motivational bias, because they are all interested in the subject. In this context, the possibility that some elements of the picture that emerges may be unrealistically positive must be taken into account.

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ANNEXES

Annex 1. Interview Questions for Teachers, Lower Primary School Teachers, and Special Edcation Teachers

1. What year were you born?
2. In which municipality do you work?
3. How many years have you been working?
4. What is your highest level of education or professional qualification in the field of education?
5. What is your profession and in which field of education do you work?
6. Please tell about your current job.
7. In your current job, how challenging do you find working with children? What are the reasons for this?
8. Are you currently, or have you been in the last 5 years, a class teacher? If so, what has been your experience?
9. Are you currently, or have you been in the last 5 years, involved in teaching Ethics?
10. Do you have any qualifications specifically related to the teaching of Ethics?
11. If yes, why did you decide to obtain this qualification? What has it enriched you?
12. Are you a member of any informal groups (e.g. Facebook) related to ethics education? What kind of group is this? Why do you find it useful?
13. Do you think that moral sense is learned or innate, or both?
14. How can we make moral sense measurable, how can we get to know this characteristic of other person?
15. What factors do you think influence the development of children's moral sense?
16. Who do you think is responsible for developing children's moral sense?
17. What methods can be used to develop children's moral sense?
18. What methods do you use? What are your reasons for choosing them?
19. What do you think about the level of moral development of the children you work with? Please give reasons for your answer.
20. In the course of your work, do you come into contact with pupils with a mild intellectual disability? (Also known as: chlidren with learning disability; IQ between 50-69.)
21. What do you think about whether a child with a mild intellectual disability can achieve the same level of moral development as a child with typical development? Please give reasons for your answer.
22. What do you think about Ethics education in schools?
23. What does moral behavior mean to you?
24. How would you describe morality today?
25. What do you think morality means for today's generation?

Annex 2. Interview Questions for Teacher Candidates, Lower Primary School Teacher Candidates, and Special Edcation Teacher Candidates

1. What year were you born?
2. In which municipality do you live?
3. What are you studying?
5. Do you have any qualifications on the field of education?
6. Do you already have experience in a pedagogical field? If yes, how many years?
7. Do you plan to obtain any qualifications specifically related to Ethics education? If so, what?
8. Are you a member of, or do you plan to join, any informally organised groups (e.g. on Facebook) related to Ethics education? What kind of group is this? Why do you or would you find it useful?
9. Do you think that moral sense is learned or innate, or both?
10. How can we make moral sense measurable, how can we get to know this characteristic of the other person?
11. What factors do you think influence the development of children's moral sense?
12. Who do you think is responsible for developing children's moral sense?
13. What methods do you know of that are suitable for developing children's moral sense? Where have you come across them?
14. What do you think about whether a child with a mild intellectual disability (also known as children with learning disability; IQ between 50-69) can achieve the same level of moral development as a child with typical development? Please give reasons for your answer.
15. What do you think about Ethics education in schools?
16. What does moral behavior mean to you?
17. How would you describe morality today?
18. What do you think morality means for today's generation?

Annex 3. Focus Group Discussion – Topics

1. Please introduce yourself in a few words (using your first name, as you may call each other). What do you do, what field of education do you work in?
2. Are you currently involved, or have you been involved in the last 5 years, in teaching Ethics?
3. What do you think about the qualifications involved in teaching Ethics?
4. Do you think that moral sense is learned or innate?
5. How can we measure moral sense, how can we get to know this characteristic of the other person?
6. What factors influence the development of children's moral sense?
7. Who do you think is responsible for developing children's moral sense?
8. What methods can be used to develop children's moral sense?
9. Can a child with mild intellectual disability achieve the same level of moral development as a child with typical development?
10. What do you think about Ethics education in schools?
11. What does moral behavior mean to you?
12. How would you describe morality today?
13. What do you think morality means for today's generation?

Emerging Research Themes in Mathematics Education: A Topic Modeling Analysis of Most Influential Journals (2019-2023)

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Abstract

As in various scientific fields, the volume of publications in mathematics education is rapidly increasing, complicating the detailed examination of academic outputs. Latent Dirichlet Allocation (LDA)-based topic modeling algorithms have gained popularity for their ability to synthesize vast amounts of data and provide an overview of emerging research themes within specific fields. This article conducts a topic modeling analysis on 1,000 scholarly articles published between 2019 and 2023 in the five most influential journals in mathematics education. The study identifies 18 research themes, comparing these with a comprehensive topic modeling study conducted in 2018 (Inglis & Foster, 2018). Newly emerging themes include Mathematical Performance and Assessment, Lesson Study, Mathematical Modeling, Social Justice, Teacher Practice, Statistical Literacy, Prospective Teachers' Noticing of Student Thinking, and Framework Design and Development. The findings indicated teacher professional development and education-related studies have been the most prolific research areas over the past five years. Additionally, the research themes and keywords highlighted the ongoing social transformation and shifts in research focuses within mathematics education. This study is expected to be a resource for researchers who conduct research and determine the research theme.

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INTRODUCTION

Research in mathematics education stands as a crucial area within the educational research landscape. Numerous studies in this field have been conducted, yielding results that are extensively discussed within academic circles. Mathematics education encompasses a variety of sub-topics, including different learning processes and the challenges students face during these processes. As knowledge within the field increases daily, traditional methods of analysis are becoming increasingly inadequate for researchers, posing significant challenges. These challenges prevent a comprehensive understanding of the literature and a broad perspective of the field. The dramatic increase in available data compels researchers to seek alternative methods of investigation. Furthermore, determining the trends and preferred topics of research within the field has become more complex (Inglis & Foster, 2018).

Researchers utilize various methods such as bibliometric analysis and systematic reviews to identify these topics and trends (Nie & Sun, 2017). Systematic reviews offer a general perspective on selected studies in terms of subject context and proven techniques. However, maintaining systematic reviews in a dynamically evolving field can be challenging (Chen, 2016). According to Chen (2016), the primary reason for this challenge is the inability of systematic reviews to provide a comprehensive and holistic view in rapidly developing areas. On the other hand, bibliometric analysis creates a network model based on data such as citations, authors, or keywords from studies conducted within a designated research area. Network modeling and the visualization of these models can reveal conceptual maps of the research field (Chen, 2016). Despite these advantages, bibliometric analysis also has its drawbacks. It primarily generates conceptual maps based on keywords alone, not incorporating the main texts or abstracts of the studies (Chen & Luo, 2019). Choi and Kwak (2019) recommend analyzing the abstract sections of studies in this field, as they typically summarize all contents and results, highlighting their significance. These abstracts contain valuable information about research trends in mathematics education. However, working with the vast textual data available in this long-established field presents various challenges in terms of time and effort, hence limiting its use.

In their study, Griffiths and Steyvers (2004) eliminated this limitation of text mining, which is an extension of data mining and defined as a method of extracting meaningful patterns from a collection of unstructured texts, by using the topic modelling method offered by text analysis on the abstracts of journals (Olson & Delen, 2008). Text data mining progresses through five stages: data gathering, data cleaning, data processing, data mining, and evaluating results (Zengul et al., 2021). Significant text mining applications include clustering, information extraction, and topic mapping. These techniques provide tools that save time and energy in processing and analyzing information (Delen and Olson, 2008).

One of the applications of text mining is topic modeling, which analyzes texts to identify themes. LDA has become increasingly popular in recent years as a method for topic modeling (Blei, 2012). LDA is a probabilistic generative model that aims to identify the main themes within a collection of textual documents (Blei et al., 2003). This model significantly reduces the dimensions (words) in a text while preserving the crucial connections among all dimensions and the main topics in subsequent documents (Blei and Lafferty, 2007). LDA assumes that a document contains multiple topics, with each word in the document presumed to stem from a particular topic (Hung, 2012). Modeling is based on estimating the probability that a particular word belongs to a specific topic. Algorithms use the most suitable probability to allocate words to a certain topic. Topic modeling not only uncovers the discussed topics within a corpus of studies but also reveals overlooked research areas. This method provides recommendations for future research, serving as a predictive tool for emerging trends within a field. Topic modeling employs unsupervised machine learning techniques using various statistical models to identify themes from large sets of textual data, making it a popular method in recent literature reviews (Asmussen & Møller, 2019; Griffiths & Steyvers, 2004; Paul & Girju, 2009). Researchers like Griffiths and Steyvers (2004) and Blei and Lafferty (2007) have applied topic modeling to understand the themes and trends emerging from academic journal literatures.

Similarly, Bittermann and Fischer (2018) employed topic modeling to identify current trends in psychology.

In the field of mathematics education, topic modeling has been effectively applied to analyze research trends. Inglis and Foster (2018) utilized this approach on articles from highly influential journals such as Educational Studies in Mathematics and the Journal for Research in Mathematics Education. Their analysis revealed 28 distinct topics, which they compared to understand evolving trends within the field. Similarly, Chen and Luo (2019) applied topic modeling to 3,963 articles from the Computers and Education Journal, identifying 24 topics. Herfort, Tamborg, Meier, Allsopp and Misfeldt (2023) conducted topic modeling on 336 studies presented at the European Society for Research in Mathematics Education (CERME) conference, focusing on technology in mathematics education. Choi and Kwak (2019) analyzed 2,556 publications from five leading international journals in mathematics education, revealing current trends in five-year intervals. The studies utilized Latent Dirichlet Allocation (LDA), a method proposed by Blei, Jordan and Ng (2003), which employs a Bayesian framework for text mining to uncover thematic structures within a field. LDA considers the textual structure and words of studies as data within a system that models topics integral to the field. Additionally, LDA not only provides an overview of the topic structure but also details the distribution of topics across individual documents. For such analyses, Knime is frequently used as a data visualisation and analysis program (KNIME, 2020). These implementations of topic modeling offer significant insights into the themes and directions evolving within mathematics education research.

Despite the presence of studies using topic modeling in mathematics education, there has been a notable absence of such applications over the last five years specifically aimed at reviewing the emerging topics and trends through research. Therefore, this study applies LDA topic modeling to abstracts from influential journals in mathematics education to identify the themes and trends from publications over the past five years (2019-2023). This approach is crucial for understanding how the field has evolved and for drawing implications for future research. By analyzing the scientific research published in influential academic journals within the field using LDA topic modeling, this study evaluates the themes derived to comprehend the development of the field and to provide insights that will guide subsequent inquiries.

This study employs LDA-based topic modeling analysis to identify the research themes focused on in the top five influential academic journals in mathematics education from 2019-2023. In this context, answers to the following two research questions will be searched:

1. What are the emerging themes in mathematics education over the last five years?

2. How have these themes evolved or differed from the existing research themes identified in previous studies?

Answering these questions will provide a detailed understanding of the dynamic shifts and advancements in the field since the last major review by Inglis and Foster in 2018. Specifically, the contributions of this research to the field can be articulated as follows. Firstly, by pinpointing the current themes, this study will outline the most actively researched areas within mathematics education over the past five years. This is crucial for researchers, curriculum developers, and policy makers to understand where the field is currently focusing and what gaps might exist. Secondly, comparing the newly identified themes with those from previous studies, particularly the comprehensive review by Inglis and Foster (2018), will highlight shifts and continuities in research focus. This comparison is vital for tracking the evolution of the field, understanding how certain areas have expanded or receded in focus, and identifying new research frontiers. Finally, the analysis will provide a clear depiction of how the field is evolving, offering insights into potential areas that require further investigation or could benefit from renewed focus. This foresight can help steer future research efforts, funding priorities, and educational policy decisions.

METHOD

The research method of the study consists of two main parts. These are data collection and LDA topic modelling. We aim to determine the research themes and trends of the field of study through the dataset obtained with LDA topic modelling.

Creation of Dataset

For the dataset creation, this study draws upon the work of Williams and Leatham (2017), who presented twenty journals that significantly influence the field of mathematics education and assessed the quality of scientific publications. Their study incorporated two types of analysis: citation-based and opinion-based. Given that the Williams and Leatham (2017) study is the most recent comprehensive assessment of journal quality in mathematics education, it has been used to guide journal selection for this research. Additionally, data were collected from the Web of Science (WoS) Social Science Citation Index (SSCI), a globally recognized database containing over 21,000 peer-reviewed high-quality scientific journals ("Web of Science Core Collection - Web of Science Group", 2020). Consequently, the citation-based evaluation from the Williams and Leatham (2017) study was utilized to rank the academic journals in mathematics education, the results of which are shared in Table 1.

This approach ensures a rigorous and systematic creation of a relevant dataset to provide a comprehensive overview of the current research landscape in mathematics education. By leveraging a citation-based selection of journals, the study aligns with established scholarly metrics, enhancing the validity of the research findings. Moreover, the use of a reliable database like WoS guarantees the inclusion of high-quality and impactful studies, providing a robust dataset for subsequent LDA topic modeling.

Table 1 Citation Ranking of 10 Journals That Publish Research in Mathematics Education (Williams & Leatham (2017)

Ranking	Journal	No. of citations (including self-citations)	No. of citations (excluding self-citations)
1	Educational Studies in Mathematics (ESM)	2,729	1,872
2	Journal for Research in Mathematics Education (JRME)	2,188	1,854
3	Journal of Mathematical Behavior (JMB)	848	554
4	For the Learning of Mathematics (FLM)	625	507
5	Mathematical Thinking and Learning (MTL)	490	429
6	Journal of Mathematics Teacher Education (JMTE)	630	427
7	Zentralblatt für Didaktik der Mathematik (ZDM)	740	376
8	Mathematics Education Research Journal	263	175
9	International Journal of Math Education in Science and Technology (IJMEST)	526	166
10	School Science and Mathematics (SSM)	307	122

As seen in Table 1, the journals were ranked as follows based on their influence in the field of mathematics education: Educational Studies in Mathematics (ESM) at first position, followed by the Journal for Research in Mathematics Education (JRME), Journal of Mathematical Behavior (JMB), For the Learning of Mathematics (FLM), and Mathematical Thinking and Learning (MTL). However, as FLM is not indexed in the Web of Science Citation Index (www.webofknowledge.com), it was excluded from the analysis, and the Journal of Mathematics Teacher Education (JMTE) was included instead. Consequently, the journals ESM, JRME, JMB, MTL, and JMTE were selected for this study, and their published research articles were incorporated into our analysis. From 2019 to 2023, a total of 1,000 articles published in these journals were collected. Only research articles were included in the analysis, excluding any other types of research publications. The dataset used in this study comprised abstracts extracted from these collected articles.

Latent Dirichlet Allocation (LDA) Topic Detection

In this research, LDA topic detection was employed to uncover themes and determine trends. For this analysis and model creation, KNIME data mining software was used (KNIME, 2020). KNIME facilitates the analysis process with its easy-to-use visual interface that offers pre-built structures instead of complex base codes. The code process for LDA topic detection was developed by researchers using the KNIME data mining software, which includes ready-to-use code blocks for essential analysis structures like text preprocessing, LDA, and lemmatization. Figure 1 represents our text mining process.
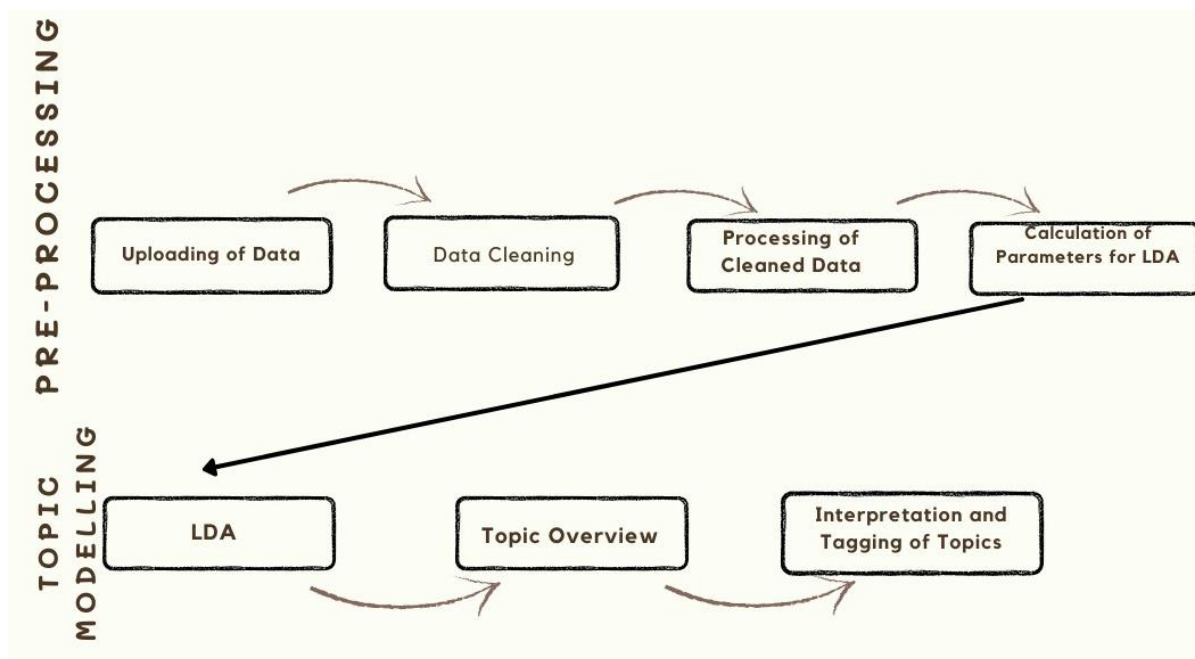
Figure 1. LDA topic detection process

In our LDA topic modeling process using the KNIME data mining software, the initial step involves loading the dataset into the system as an Excel file. The next step is to apply text preprocessing techniques to the abstracts within the dataset. These techniques include tagging, filtering, and lemmatization, transforming words into their most meaningful forms based on context. The objective of this step is to remove various punctuation marks, word suffixes, repetitions, and common terms such as "the" that may affect the analysis.

After cleaning the data, the processed words in their purest and cleanest forms are transferred to the LDA topic extraction node. It is essential that the parameters for the LDA topic extractor node are set in advance. Based on recommendations from prior studies, the parameters were set with alpha (α) at 0.1 and beta (β) at 0.01 (Gurcan et al., 2022). Another critical parameter for the LDA topic extraction node is the number of topics to analyze. Various methods, such as the elbow method and silhouette method, are available to determine the best number of topics. In our study, we utilized perplexity, as used by Inglis and Foster (2018), to ascertain the most suitable number of topics.

Once the optimal number of topics was determined using perplexity, the model generated was reviewed by experts who examined the most representative studies and the words with the highest representation weight to assign the most appropriate names to the topics. This process ensures that the topics identified are both significant and relevant to the current trends and themes in mathematics education research.

FINDINGS

The findings from our LDA-based topic modeling analysis are presented under three main headings. Firstly, the results of the perplexity analysis are presented, which focuses on the number of research themes around which the studies published in the top five mathematics journals indexed by WoS from 2019 to 2023 are centered. Secondly, we will present the themes identified through the LDA-based topic modeling analysis in response to our first research question. Lastly, in alignment with our second research question, we discussed how the identified research themes have differed from those identified by Inglis and Foster (2018) in the last five years.

Perplexity Plot: Number of Topics

Determining the appropriate topic-word distribution in LDA topic modeling analysis is of significant importance. This measure helps to ascertain the suitable number of research themes from the 1000 scientific publications collected from the five most influential academic journals in the field of mathematics education. The results of the perplexity analysis used to determine the number of topics are shared in Figure 2.
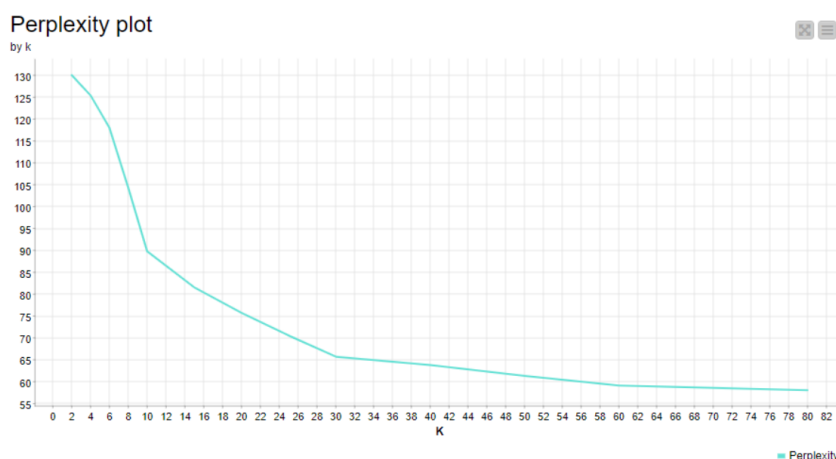
Figure 2. Perplexity K topics

As presented in Figure 2, the number of topics for the 1000 studies reviewed ranges from 2 to 80. According to Maier et al. (2018), the most suitable number of topics is determined by examining the points where the perplexity K topics graph shows sudden and significant breaks. This approach, referred to as the elbow method, was proposed by Dewi and Thiel (2017). Considering these methodologies, a clear break in the graph at 10 and 30 topics can be observed in Figure 2. Upon detailed examination of these values and intervals, our research team has identified a maximum of 18 distinct topics that meaningfully correlate with the dataset. Therefore, the optimal number of topics has been determined to be 18.

Research Themes Extracted Through Topic Modeling

The main findings of our study are based on the 18 topics derived from the perplexity analysis. Using the KNIME software, the analysis results in a map created from the studies clustered under each topic, using keywords and abstracts. The naming of these topics has been conducted in light of the relevant literature, considering the data from keywords and abstracts. During this naming process, the weights of the keywords presented under each topic were also taken into account. Moreover, data files generated through the KNIME program were analyzed to examine the weights of the studies presented under each topic.

This part of the study details how the topics were named, with the keywords used in the topic naming and the percentage of studies under each topic within the total body of work presented in Table 2. This section will explain how the topics were named based on these data.

Table 2 Topic name, topic keywords and proportion of the clusters within the dataset

Topic	Topic name	Top 10 most relevant terms(sorted by relevance)	% of tokens
Topic-0	Mathematical performance and assesment	student, mathematics, assessment, study, belief, self-efficacy, performance, test, item, attitude	6.4
Topic-1	Function concept	function, student, concept, calculus, study, activity, theory, participant, result, understand	3.1
Topic-2	Proof and argumentation	proof, student, argumentation, example, argument, mathematical, mathematician, definition, collective, conjecture	6.1
Topic-3	Algebraic thinking	student, reasoning, meaning, task, relationship, algebraic, equation, function, quantity, mathematical	7.5
Topic-4	Digital environment	student, environment, datum, generalization, pattern, geometry, dynamic, representation, statistical, process	5.1
Topic-5	Addition and subtraction	child, word, study, strategy, skill, task, intervention, ability, knowledge, numerical	4.3
Topic-6	Lesson study	study, lesson, mathematics, factor, problem-solving, adaptation, activity, analysis, sfon, japanese	2.4
Topic-7	Prospective teachers noticing of student thinking	prospective-teacher, pst, course, student, feedback, prospective, study, pt, student-thinking, productive	4.7
Topic-8	Language	language, student, concept, mathematics, classroom, programming, space, mathematical, learner, multilingual	5.0
Topic-9	Mathematical discourse	discourse, student, mathematical, classroom, discussion, lesson, interaction, framework, learning, authority	7.5
Topic-10	Mathematical modelling	task, mathematical, strategy, student, model, modeling, solution, process, study, modelling	6.6
Topic-11	Curriculum	textbook, curriculum, context, approach, question, difference, school, explanation, educational, material	3.0
Topic-12	Fraction	fraction, unit, reasoning, multiplicative, student, proportional, multiplication, concept, equivalence, understanding	4.5
Topic-13	Socail justice	mathematics, Mathematics-education, social, research, student, community, school, black, experience, narrative	5.8
Topic-14	Teacher Practice	teacher, practice, teaching, mathematics, instructional, instruction, pedagogical, program, knowledge, identity	8.0
Topic-15	Statistical literacy	Datum, mathematical, mathematics, reading, mathematics-education, critical, literacy, pandemic, statistical, Covid-19	3.1
Topic-16	Framework desing and development	research, knowledge, desing, learning, activity, framework, approach, paper, perspective, development	7.3
Topic-17	Professional development	teacher, practice, Mathematics-teacher, teaching, classroom, lesson, experience, study, context, professional-development	8.3

Topic 0: Mathematical Performance and Assessment

The first research theme identified through the LDA topic modeling analysis conducted with the KNIME software is named "Mathematical Performance and Assessment." This theme encompasses 64 scientific studies, accounting for 6.4% of the total dataset. The keywords "mathematics," "assessment," and "performance" were directly employed in naming this topic. Upon reviewing the publications clustered under this theme, it was found that they primarily discuss the assessment of students' mathematical knowledge and skills, how such assessments impact students' performance, and how mathematics teaching can enhance this performance. These findings align with research like that of Dowker et al. (2019), which examines similar aspects.

Topic 1: Function Concept

The theme "Function Concept" comprises 31 studies, representing 3.1% of all the analyzed works. The naming of this topic directly utilized the keywords "function" and "concept." Studies within this theme focus on the learning and understanding of basic ideas about functions, as illustrated

by research such as that conducted by Martínez-Planell and Trigueros (2019), which explores conceptual understanding in this area.

Topic 2: Proof and Argumentation

For Topic 2, the keywords "proof" and "argumentation" were directly used in the theme's naming. This theme includes 61 studies, corresponding to 6.1% of the total dataset. The publications under this theme are primarily concerned with the evaluation of arguments produced in mathematics education and teaching and discussions based on proofs. Research by Ko and Rose (2021) exemplifies this focus, exploring how students and teachers engage with mathematical argumentation and proofs. The use of these keywords provides a general descriptor that resonates with the existing literature on the topic.

Topic 3: Algebraic Thinking

Under Topic 3, the analysis revealed that 75 scientific studies are clustered, constituting an examination of students' transformations in algebraic thinking skills through various algebraic concepts and applications. The keyword "algebraic" emerged with the highest weight and was directly incorporated into the theme's naming. The reviewed literature under this theme predominantly discusses how students engage with and understand algebraic concepts and their applications, as seen in the work of Ellis et al. (2020). Additionally, studies like those by Pittalis et al. (2020) emphasize discussions around students' thought processes concerning algebraic applications, leading to the inclusion of "thinking" in the theme's title to align with the existing literature, thus coining the term "Algebraic Thinking."

Topic 4: Digital Environment

Topic 4 encompasses 51 scientific studies (5.1% of the dataset), focusing on how students and teachers utilize digital tools and the impacts of these tools on teaching. The keyword "environment" had the highest weight and was directly used in the theme's naming. Research under this theme, like that by Yao and Manouchehri (2019), examines the use of digital tools in educational settings and their effects on teaching methodologies. Further literature review reveals a consistent focus on digital tools in teaching, prompting the use of "digital" to refine the theme's title to "Digital Environment," reflecting the integration of digital tools in educational contexts.

Topic 5: Addition and Subtraction

For Topic 5, 43 studies (4.3% of the dataset) are clustered under the theme "Addition and Subtraction." This theme was named based on the prevalent focus in the clustered studies on the effects of teaching experiments and practices concerning addition and subtraction, as demonstrated in the research by Kullberg, Björklund, Brkovic and Runesson Kempe (2020). The analysis of the existing literature indicates that the concepts used in teaching addition and subtraction practices align well with the keywords identified under this topic, confirming the appropriateness of the theme's naming.

Topic 6: Lesson Study

For Topic 6, clustered around 24 scientific studies (2.4% of the dataset), the theme has been named "Lesson Study." The keywords "lesson" and "study" were directly utilized in the theme's naming. This theme covers research on how teachers and pre-service teachers collaboratively develop, implement, observe, and evaluate lesson plans, enhancing their professional knowledge and teaching skills. Studies like those by Lendínez Muñoz, García García, Lerma Fernández and Abril Gallego (2019) focus on these aspects, indicating the practical and collaborative nature of lesson studies in professional development.

Topic 7: Prospective Teachers Noticing of Student Thinking

Under Topic 7, which includes 47 studies (4.7% of the dataset), the theme "Prospective Teachers Noticing of Student Thinking" emerged. This theme was named highlighting the key phrase "prospective teacher," which carries significant weight among the keywords. The clustered studies discuss how pre-service teachers' noticing skills are applied and developed through various instructional outcomes. Research by Warshauer et al. (2023) exemplifies this focus, showing an emphasis on how these future educators perceive and respond to student thinking, aligning closely with the concept of "noticing" from the literature.

Topic 8: Language

For Topic 8, the keyword "Language," holding the highest weight, guided the naming of the theme. The 50 clustered studies explore how language is handled within the context of mathematics classrooms, particularly focusing on linguistically and racially marginalized students. The research, as illustrated by Barwell (2020), debates how linguistic frameworks affect students' learning outcomes and the concretization of mathematical ideas, emphasizing the critical role language plays in educational equity and understanding.

Topic 9: Mathematical Discourse

In Topic 9, which clusters 75 scientific articles, the theme "Mathematical Discourse" has been identified. The keywords "Mathematical" and "discourse" were directly employed to name the theme. The research within this theme examines the effects of classroom practices, such as discussions and interactions (notated by the same keywords) on the instructional activities used in mathematics teaching. Studies by Weingarden, Heyd-Metzuyanim and Nachlieli (2019) highlight how classroom discourses influence the educational experiences and learning of students, emphasizing the importance of communicative practices in enhancing mathematical understanding.

Topic 10: Mathematical Modelling

Topic 10, named "Mathematical Modelling," directly employs the keywords "mathematical" and "modelling." This theme, clustering 66 studies, focuses on discussions around concepts and applications related to mathematical modelling. Significant research, such as the study by Krawitz et al. (2022), explores how mathematical modelling is utilized to solve real-world problems and enhance mathematical understanding.

Topic 11: Curriculum

In Topic 11, identified as "Curriculum," 30 academic publications (3.0% of the dataset) are clustered. The keyword "curriculum" was used directly in the theme's naming. Research under this theme often discusses the impacts of educational reforms on mathematics curricula across various countries, with studies such as those by Drijvers, Kodde-Buitenhuis and Doorman (2019) examining the evolution of curricular standards and their implementation challenges.

Topic 12: Fraction

Topic 12 has been named "Fraction," centering around 45 studies (4.5% of the dataset), with "fraction" being the highest weighted keyword used directly in the theme's naming. This theme explores the conceptual structures students form around fractions, highlighted in research by González-Forte et al. (2022), which delves into students' understanding and misconceptions regarding fractions.

Topic 13: Social Justice

Topic 13, termed "Social Justice," includes 58 scientific studies. The theme employs the keyword "social" directly in its naming. The clustered publications examine issues of social injustice within mathematics classrooms and their implications for teaching. Research, such as that by Chen (2023), discusses how educators address social inequalities that emerge in the classroom environment, often focusing on dimensions such as race, gender, and cultural backgrounds. The inclusion of the term "justice" complements this focus, aligning with scholarly discussions on equity and inclusion in mathematics education.

Topic 14: Teacher Practice

Topic 14, "Teacher Practice," comprises the largest cluster of studies in the dataset, with 80 scientific studies accounting for 8.0% of all analyzed works. The theme was directly named using the two highest weighted keywords: "teacher" and "practice." Research within this theme primarily explores the changes and effects in mathematics teachers' methods and knowledge due to various practices and techniques. For instance, studies like those by Woods and Weber (2020) discuss how different teaching approaches impact teacher practice and student outcomes, highlighting the dynamic nature of educational methodologies.

Topic 15: Statistical Literacy

The theme for Topic 15 is "Statistical Literacy," which clusters 31 studies (3.1% of the dataset). This theme has gained particular relevance due to the interpretation and discussion of statistical data that became prominent during the COVID-19 pandemic, as noted in research by Borba (2021). The focus on statistical literacy reflects the growing importance of data interpretation skills in education, particularly in understanding real-world events through a mathematical lens.

Topic 16: Framework Design and Development

In Topic 16, 73 studies (7.3% of the dataset) are grouped under the theme "Framework Design and Development." The keywords "design" and "development" were employed directly in naming the theme, which examines the theoretical and practical approaches used in mathematics education. Research, such as that by Simon (2022), focuses on designing and developing frameworks that enhance the effectiveness of mathematical instruction and learning strategies, addressing the needs of both students and educational goals.

Topic 17: Professional Development

Topic 17, "Professional Development," contains the highest number of clustered studies, with 83 research articles. The theme name directly incorporates the phrase "Professional Development," reflecting the content of the clustered publications. Studies within this theme, such as those by Matranga and Silverman (2022), discuss the design and critique of various professional development programs for teachers, emphasizing their crucial role in teacher growth and improvement in teaching practices.

Differentiation in Research Themes

In this section, we compare the research themes identified in this study with those established by Inglis and Foster (2018) to highlight both newly emerged themes and those that have continued relevance in the field of mathematics education. Table 3 presents a comparative analysis of the topics identified by Inglis and Foster (2018) against the themes extracted from this study. In the table, themes that are similar are indicated by their names, while differing themes are marked with an asterisk (*). This comparison is based on both the theme names and the key terms found within each theme. Despite some themes having different names, they may aggregate under the same key terms,

indicating conceptual similarities. For example, as seen in Table 3, the "Fraction" theme identified in our model shows similarities with the "Rational Numbers" theme from Inglis and Foster (2018).

Table 3 Cross thematic comparisons

Research topics identified in this study	Research topics identified by Inglis and Foster (2018)
Mathematical performance and assesment	*
Function concept	Analysis
Mathematical modelling	*
Curriculum	Curriculum (especially Reform)
Fraction	Rational Numbers
Social Justice	*
Teacher Practice	*
Statistical literacy	*
Framework desing and development	*
Professional development	Teacher knowledge and beliefs
Proof and argumentation	Proof and argumentation
Algebraic thinking	School algebra
Digital environment	Dynamic geometry and visualization
Addition and subtraction	Addition and subtraction
Lesson study	*
Prospective teachers noticing of student thinking	*
Language	Multilingual learners
Mathematical discourse	Observations of classroom discussion

This comparative analysis enables the identification of new topics that have emerged in the last five years (2019-2023), illustrating how shifts within the field have influenced the evolution of research themes. Based on the information provided in Table 3, eight themes distinctly different from those in the Inglis and Foster (2018) model have been identified. These are:

- Mathematical Performance and Assessment
- Lesson Study
- Mathematical Modelling
- Social Justice
- Teacher Practice
- Statistical Literacy
- Prospective Teachers Noticing of Student Thinking
- Framework Design and Development

DISCUSSION AND CONCLUSION

In the field of mathematics education, an LDA analysis conducted on publications from 2019 to 2023 in the top five academic journals indexed by the Web of Science (WoS) has identified 18 research themes. Out of these themes, 10 show similar characteristics to those identified by Inglis and Foster (2018) through their topic modeling analysis. Three of these themes have been directly matched using the same nomenclature: Curriculum, Proof and Argumentation, and Addition and Subtraction. The other seven themes were aligned based on similar key terms and a review of the literature, indicating they cover comparable scopes. These themes are Digital Environment, Algebraic Thinking, Fraction, Function Concept, Professional Development, Language, and Mathematical Discourse.

Correspondingly, Inglis and Foster (2018) named these themes as Dynamic Geometry and Visualization, School Algebra, Rational Numbers, Analysis, Teacher Knowledge and Beliefs, Multilingual Learners, and Observations of Classroom Discussion.

During the comparison of these research themes, both the literature and the keywords clustered under each theme were examined. For example, the theme named Dynamic Geometry and Visualization by Inglis and Foster (2018) was renamed as Digital Environment in our model. This change reflects an expanded use of digital technologies not limited to the teaching of geometry but encompassing a wider range of teaching areas, such as statistics and probability, as illustrated by research like Herford et al. (2023). The findings indicate that while some themes have maintained their relevance, others have evolved or expanded in scope to adapt to new educational technologies and methodologies.

Our LDA analysis has redefined the research theme previously named "Multilingual Learners" by Inglis and Foster (2018) as "Language." This reclassification stems from a broader examination of the role of language diversity and cultural concepts within mathematics education as discussed in recent studies. Ryan (2022) focuses on language diversity in classroom mathematics instruction, while Morris (2021) discusses the importance of language and culture in teaching probability. These insights have guided us to adopt a more encompassing term, "Language," reflecting the broad impact of linguistic factors across various aspects of mathematics education.

Our findings indicate that out of the 18 identified themes, 10 have maintained their relevance as research themes over the past five years. However, it is evident that some themes have evolved in response to new disciplines, approaches, and global events. Among the notable shifts observed through our LDA-based topic modeling analysis is the emergence of eight research themes: Mathematical Performance and Assessment, Lesson Study, Mathematical Modelling, Social Justice, Teacher Practice, Statistical Literacy, Prospective Teachers Noticing of Student Thinking, and Framework Design and Development.

Particularly, "Statistical Literacy" has gained prominence in the context of the COVID-19 pandemic, highlighting how significant societal and global events can influence the focus of mathematics education and teaching. The relevance of statistical literacy has been underscored by research such as Kwan et al. (2021), who examined the interpretation of COVID-19 data in Korea, and da Silva et al. (2021), who discussed integrating statistical education through graphical representations of data in Brazil. These discussions illuminate the critical role of statistics in understanding and responding to global crises within educational settings.

Furthermore, the integration of diverse disciplines in educational research, supported by systematic reviews and topic modeling studies such as those by Vijayan (2021) and Rodríguez and Pulido-Montes (2022), validates the broadening scope and interdisciplinary nature of current educational research. These shifts signify an adaptive and responsive mathematics education field that not only reacts to immediate educational needs but also incorporates broader socio-economic and cultural dimensions, thereby enriching the academic discourse and practical applications within the discipline.

The theme of "Social Justice" reflects a transformative impact on educational practices influenced by societal shifts toward greater equity and inclusion, such as gender and racial equality (Gutiérrez, 2013). This focus aligns with findings that suggest an ongoing evolution in how social justice is integrated within mathematics education (Leyva, 2021). In contrast to Inglis and Foster (2018), who might not have emphasized this dimension as prominently, our findings indicate a significant shift towards addressing these critical issues within educational settings.

Similarly, the theme of "Mathematical Modelling" has shifted towards a more process-oriented focus in recent years. While Inglis and Foster (2018) might have touched on this theme, the current emphasis is on the establishment of real-life situational problems and their resolution through

mathematical processes (Shahbari & Tabach, 2020). This suggests a transition from solving predefined problems to engaging with the processes and design of modeling in educational practices, marking a significant development in the application of mathematical modeling in education.

"Mathematical Performance and Assessment" is another theme that has evolved over time. Recent literature, such as that by Evans and Jeong (2023), discusses how assessments of mathematical knowledge and skills can impact student performance and how teaching can enhance this performance. This theme could be seen as an evolution of the "Constructivism" theme discussed by Inglis and Foster (2018), reflecting a shift towards understanding and improving instructional outcomes based on constructive feedback and learning theories.

Furthermore, the theme "Framework Design and Development" emphasizes the creation of systematic and structured approaches to enhance teaching processes and student learning (Simon, 2022). This theme shares similarities with "Mathematical Performance and Assessment" in that both focus on developing student-centered teaching strategies, providing a solid foundation for improving educational practices. These related themes highlight the importance of structured educational frameworks that are crucial for implementing effective teaching strategies and enhancing learning outcomes.

The theme "Prospective Teachers Noticing of Student Thinking" emphasizes the significance of teacher candidates recognizing and understanding students' thought processes. Research by Lee and Lee (2023) and Tyminski et al. (2021) illustrates how this awareness is integrated into instructional practices, providing valuable insights into teacher training, pedagogical knowledge, and student learning processes. This area supports the transformation from 'Pupil' to 'Student' as discussed by Herford (2023), and underscores the evolving focus of teacher training towards leveraging technology not just as a tool, but as an integral part of pedagogical strategies.

Herford (2023) also highlighted how teachers are increasingly shaping their research interests based on the pedagogical needs they encounter, rather than solely on available technological solutions. This is in line with the "Professional Development" theme identified in our model, which has shown significant overlap with "Teacher Practice." These themes underscore a growing interest in teacher education and practice over the last five years, as reflected in studies by Matranga and Silverman (2022), and indicate a broader trend within mathematics education focusing on effective and student-centered teaching methodologies.

Moreover, the "Lesson Study" theme, identified in our model, resonates with findings from Lendínez Muñoz et al. (2023) and Miyakawa and Winsløw (2019), illustrating how collaborative approaches among teachers can develop more effective teaching methods. This theme highlights the professional development tool's role in enabling mathematics educators to collaboratively enhance their instructional strategies, reflecting a shift towards more collaborative and reflective teaching practices.

These emerging themes not only signify a transformation in the priorities and approaches within mathematics education but also suggest a departure from the themes identified by Inglis and Foster (2018). Our analysis reveals a heightened emphasis on teacher professional development, reflecting a shift towards more nuanced and targeted educational strategies that address both teacher and student needs in contemporary educational settings.

This LDA-based topic modeling study has explored how research themes in the top five influential journals in mathematics education have evolved since the 2018 study by Inglis and Foster. We propose that systematic reviews be conducted on these eight newly identified themes to further understand their development and implications in the field. Such studies would facilitate tracking these emerging topics, documenting research under each theme, and gaining new insights that could guide future educational practices and research in mathematics education.

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Turkish Adaptation Study of the Cognitive Load Scale: Reliability and Validity of the Cognitive Load Scale in Turkish Culture

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Abstract

The purpose of this study is to perform Turkish adaptation of the "Cognitive Load Scale (CLS)" developed by Hwang, Yang, and Wang (2013) and to test its validity and reliability in Turkish culture. The Cognitive Load Scale was developed to determine the cognitive load experienced by learners during any learning and instructional activities. The scale consists of mental load and mental effort sub-factors that aim to determine the cognitive load experienced by learners during educational activities. The original scale consists of eight items and two sub-factors, with five items in the mental load sub-factor and three items in the mental effort sub-factor. Turkish adaptation of the scale was conducted on a sample of 376 pre-service teachers enrolled in two different education faculties. The Turkish scale, the validity and reliability of which was conducted with 376 pre-service teachers, was found to have a four-item and two-factor structure; the factor structures were valid; and internal consistency coefficients were found 0.80 for the total scale, .89 for the first sub-factor, and .78 for the second sub-factor. Besides, the confirmatory factor analysis revealed the following fit index values: ($\chi2$=2,2, sd=1, p>.01), RMSEA=.056 and $\chi2/df$=2,2 and RMR= .014, GFI= 0.997, AGFI= 0.971, NFI= 0. 99, CFI=0.99, IFI= 0.99, indicating the recommended criteria. It can be said that the adapted scale can be used in academic studies related to cognitive load.

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INTRODUCTION

The individual is an active participant who takes responsibility for his/her own learning in the process of learning to learn. The ability to regulate and control cognition is directly related to the learner's realization of meaningful and functional learning in the individual and active structure of learning. Such a process requires interactive teaching environments related to effective instructional design models that increase the effective cognitive load and decrease the extraneous cognitive load. Reorganizing different knowledge, attitudes, and skills and creating new knowledge, skills, and attitudes are highly important for learners when they face complex problems. The learners' organization network between the working memory and long-term memory is of crucial importance for the use of this cognitive architecture for the solution to novel problems. Hence, recent developments in the fields of instructional design, learning psychology, and cognitive neuroscience have clarified the socio-emotional and effortful features of human cognition and its complex structure that finds meaning in the individual. For this reason, the importance of cognition (features such as the interaction and organization of networks between working memory and long-term memory) is valuable in using instructional design structures for more effective and meaningful learning. In such a process, we encounter the cognitive load theory as an effective theory in the instructional design process (Sweller, Van Merriënboer & Paas, 2019; Paas & Van Merriënboer, 2020). Over the last three decades, the cognitive load theory (CLT) has evolved to understand the effects of instruction and instructional materials on students' achievement (Feldon, Callan, Juth & Jeong, 2019).

Limited capacity and duration of working memory are the focus of CLT (Sweller, Merriënboer & Paas, 2019). In this process, the sum of intrinsic cognitive load, extraneous cognitive load, and effective cognitive load should not exceed the working memory capacity so that learners can maintain their meaningful learning (Sweller & Sweller, 2006). For this reason, the determination of the unique cognitive load of each learner is important. Since it is not possible to measure cognitive load directly in a practical way, its measurement has recently become an issue addressed in the literature. In this respect, the purpose of this study is to perform Turkish adaptation of the "Cognitive Load Scale (CLS)", which was developed by Hwang, Yang, and Wang (2013) and which addresses reliable and valid indicators to address the types of cognitive load in the current literature, and to test its validity and reliability in Turkish culture.

Theoretical Framework

The Cognitive Load Theory

The cognitive load theory (CLT) is an instructional theory based on human cognitive structure and architecture and developmental psychology (Sweller, Ayres & Kalyuga, 2011; Sweller, Merriënboer & Paas, 2019). Five basic principles can be used to explain this theory (Sweller & Sweller, 2006). A general evaluation of these principles indicates the following structure: learners receive information from others, which is usually teachers, in the problem-solving process and analyze it using the *reorganization* principle. If they cannot receive information from others, they randomly produce new information and test its effectiveness by using randomness as the *formation principle*. Before it is stored indefinitely in our large, long-term memory using the principle of *information storage*, this information is processed in working memory, which has limited capacity and duration, using the principle of *narrow limits of change*. To manage appropriate action using the *environmental regulation and connection* principle, uncertain amounts of stored information can then be transferred back to working memory based on signals from the external environment. These five principles serve as the cognitive basis for instructional design (Sweller et al., 2011).

Three types of cognitive loads are included in the cognitive load theory: intrinsic load, extraneous load/ineffective load, and germane load/effective load (Sweller, Van Merrienboer & Paas, 1998). Intrinsic cognitive load depends on the nature (difficulty) of the content to be learned as well as the learner's experience level (Van Merrienboer and Ayres, 2005). Extraneous cognitive load is the loading of working memory as a result of poor instructional materials and designs. Extraneous

cognitive load is high when the instructional design includes inappropriate content or different instructional materials negatively affecting the information processing process. With this notion, extraneous cognitive load is seen as an error in the whole instructional process (Van Merrienboer and Ayres, 2005), yet it is possible to regulate and control the extraneous cognitive load with the role of instructional designers. Germane or effective cognitive load emerges in the processes enabling the organization and regulation of mental structures. Forming effective cognitive load is of vital importance in forming functional meaning-making process in learning (Chen, Paas & Sweller, 2021). In such a process, the sum of intrinsic cognitive load, extraneous cognitive load and effective cognitive load should not exceed the capacity of working memory (Sweller & Sweller, 2006). In this process, CLT suggests that the human cognitive architecture develops to effortlessly assimilate primary knowledge (i.e., survival knowledge such as recognizing faces) rather than biologically secondary knowledge (i.e., cultural knowledge such as reading texts) (Sweller et al., 2011).

Cognitive load is generally defined as a structure representing the load of performing a particular task on the cognitive system (Sweller, Van Merriënboer & Paas, 1998). Both are conceptualized as a task-based dimension (i.e., mental load) and a practice-based dimension (i.e., mental effort) affecting the learner's performance. We encounter the concepts of mental load and mental effort in this process (Sweller, Van Merriënboer & Paas, 1998; Hwang, Yang & Wang, 2013). Based on these arguments, teaching competence is best predicted by a combination of the mental effort employed and the level of tasks performed by learners (Van Merriënboer & Paas, 1998). Therefore, learners' mental effort while performing learning tasks is also an important cognitive component in cognitive load, especially in effective cognitive load. Mental effort refers to the amount of cognitive capacity or resources employed by the learner for performing the task (Sweller, Van Merriënboer & Paas, 1998). In addition, three main categories can be classified for the mental effort measurement techniques (Wierwille and Eggemeier, 1993), which includes subjective, physiological, and task- and performance-based indices, with a range of individual assessment techniques in each category. This cognitive architecture also consists of two separate memories that have different capacities and qualities. While Long Term Memory (LTM) is considered permanent and hypothetically unlimited, Working Memory (WM) is a temporary information processor with limited capacity (Cowen, 2001). Learning can be hindered by cognitive overload due to the limited capacity of WM (Sweller et al., 2019). Therefore, CLT aims to optimize the information processing load while learning biologically secondary information (Sweller et al., 2019). In this process, minimizing the intrinsic and extraneous (ineffective load) cognitive load and making arrangements related to instructional design to make germane load/effective load functional are considered to increase the level of meaningful learning in the instruction process. While intrinsic and extraneous cognitive load varies mostly depending on the instructional environment, effective cognitive load is related to processes directly related to learning, such as the creation and automation of schemas (Van Merrienboer and Ayres, 2005). While the intrinsic cognitive load is affected by the topic being learned, the extraneous cognitive load is affected by the content organization design of the topic being learned. The amount of effective cognitive load is considered to increase as appropriate instructional designs reduce extraneous cognitive load and contribute to learners creating more interactive schemas. For this reason, teachers to provide learners with guided learning as qualified instructional designers could contribute to the desired level of cognitive load experienced by students. Therefore, it is important to organize the Teaching Principles and Methods course, which is an important course in teacher education, in a way to contribute to increasing the effective cognitive load of instructional design and to provide pre-service teachers with the necessary competencies to minimize the intrinsic and extraneous cognitive load in instructional design. In this process, the determination of the level of cognitive load among pre-service teacher learners becomes an important topic.

Measurement of Cognitive Load

Although the multidimensional structure of cognitive load and the measurement of the complex relationship between performance, mental load, and mental effort remains unclear for researchers (Sweller, Van Merrienboer & Paas, 1998), studies have generally used two different methods, namely experimental and analytical methods. Experimental methods include the estimation

of mental effort and performance, the collection of subjective data using rating scales, and the collection of performance-related data using primary and secondary task techniques. The majority of studies on cognitive load theory seem to have used rating scales, psychological and secondary task techniques, while analytical methods were not preferred much (Paas, Renkll & Sweller, 2004). An analysis of the literature (Paas, 1992 in Yang, Jen, Chang & Yeh, 2018; Cierniak, Scheiter & Gerjets, 2009; Leppink, Paas, Vleuten, Gog & Merriënboer, 2013; Anmarkrud, Andresen & Bråten, 2019; Hwang, Yang & Wang, 2013) shows that many direct and indirect measurement tools have been developed to determine learners' cognitive load levels. Observations done using the Mental Effort Rating Scale developed by Paas (1992) is a pioneer in the field (Paas, Van Merriënboer, & Adam, 1994; as cited in Yang, Jen, Chang, & Yeh, 2018). The scale requires participants to rate their cognitive effort on the learning task on a nine-point scale (1-very little to 9-very much). As they have shown a positive correlation with participants' performance, this scale as well as single-item cognitive load scales have been used in different studies. Besides, either general cognitive load or one of the cognitive load types is measured. In most cases, a single Likert item is used and the number of categories in the item typically varies. The number of items can be five (e.g., Salden, Paas, Broers, and Van Merriënboer, 2004), six (e.g., Cierniak et al., 2009) or nine (e.g., Eysink et al., 2009; Paas, 1992).

The scale developed by Cierniak et al. (2009) addresses three dimensions: the perceived difficulty of the learning content (ICL), perceived difficulty of the material presented (ECL), and concentration during the learning process (GCL). Similarly, a ten-item Likert-type scale was developed by Leppink et al. (2013 to address ICL, ECL, and GCL. Ayres (2006) also developed a rating scale to measure ICL, ECL, and GCL separately (in Eysink, De Jong, Berthold, Kollöffel, Opfermann & Wouters, 2009). On the other hand, although it is not clear to what extent workload and cognitive load refer to the same concept in different settings, the NASA-TLX is used to assess workload on a five to seven-point scale (Hilbert & Renkl, 2009). In addition, a ten-item scale was developed by Leppink et al. to address ICL, ECL, and GCL. This scale includes three items in ICL, three items in ECL, and four items in GCL. Hwang et al. (2013) developed the Cognitive Load Scale based on the measurements by Paas (1992) and Sweller, Van Merriënboer, and Paas (1998). The scale is a six-point Likert scale consisting of two sub-scales as mental load (five items) and mental effort (three items). Dönmez, Akbulut, Telli, Kaptan, Özdemir & Erdem (2022) developed a 13-item and three-factor scale to address intrinsic, extraneous, and effective cognitive load in computer-based learning environments. Cronbach's alpha coefficient was found.88 for the total scale, indicating that it is a functionally comprehensive scale addressing all three dimensions of Turkish culture. However, despite broader acknowledgments indicating the requirements of the integration of both cognitive and non-cognitive processes of learning functions (Plass & Kaplan, 2015), most cognitive load theory studies focus on the relationship between memory demands during learning, schema formation, and subsequent performance, without paying attention to the interactions between emotions or motivation and cognitive load (Feldon, Callan, Juth & Jeong, 2019)." The performance of working memory affects the cognitive load. Therefore, the necessary importance given to mental effort is believed to contribute to improving the level of germane and effective cognitive load. For this reason, the Cognitive Load Scale developed by Hwang et al. (2013) is functional for the evaluation of both mental load and mental effort as a whole. As stated by Sweller et al. (1998), the determination of learners' cognitive load levels is important in making effective cognitive load functional. In addition, another factor that makes the study valuable includes addressing the related scale in the context of Turkish culture and looking at its functionality in this direction.

This study performed the adaptation of the scale based on the theories by Sweller et al. (1998) and Pass (1992), which are accepted in the field of cognitive load, to Turkish culture and examined its validity and reliability using confirmatory factor analysis. Hence, the purpose of this study is to test the reliability and validity of the Turkish version of the Cognitive Load Scale (CLS). This scale was adapted so that it could be used in Turkey to determine the cognitive load tendencies (mental load and effort sub-scales) in the activities performed by students in the learning process as well as different types of research to be conducted in this field. Hence, the study tests and discusses the reliability and validity of the Cognitive Load Scale in Turkish culture.

METHODS

Study Design and The Study Group

The Cognitive Load scale was developed by Hwang, Yang, and Wang (2013) to measure learners' cognitive load levels in any learning and instructional activities. Two main studies were conducted during the Turkish adaptation process of the scale: (1) translation study and (2) validity and reliability study. Expert linguists were consulted during the translation phase. Exploratory and confirmatory factor analysis methods were used during the validity study of the scale.

The study group for the Turkish adaptation of the Cognitive Load Scale consisted of 400 students who were enrolled in the teaching program at the Faculties of Education at Pamukkale University (n:214) and Trabzon University (n:186) in the 2021-2022 academic year. After data were organized and outliers and missing values were removed, the study data were from 376 participants including 170 students from TRU and 206 students from PU.

Measurement Tool

The measurement tool was developed by Hwang, Yang, and Wang (2013) based on the measurements by Paas (1992) and Sweller, Van Merriënboer and Paas (1998). It consists of eight items on a six-point Likert scale, which includes 5 items for "mental load" (items 1, 2, 3, 4, 5) and 3 items for "mental effort" (items 6, 7, and 8). Cronbach's alpha values of the two factors were found to be 0.86 and 0.85, respectively.

Data Analysis

Data were analyzed using a statistical program, and the significance level was accepted as .05 for the interpretation of the results. Descriptive analyses and group comparisons were performed using SPSS 21.0. Confirmatory factor analysis was conducted using AMOS. For validity, the construct validity of the scale adapted to Turkish was examined by exploratory factor analysis to evaluate its structure in Turkish culture. In addition, item-total correlations were examined to determine the power of the scale in distinguishing between people with high and low levels of cognitive load. On the other hand, item analysis was conducted based on the upper-lower group averages. For reliability of the scale adapted into Turkish, Cronbach's α correlation coefficient was calculated to test the consistency of the scale items with each other

FINDINGS

Scale adaptation studies aim to adapt scales developed in other cultures to different languages and cultures. Several national and international scale adaptation studies have been conducted and information on the process of cross-cultural scale adaptation has been provided in the literature. The studies conducted have many common points. In this regard, stages indicated by Cohen, Cohen, West, Aiken (2003), Field, (2005), Çokluk, Şekercioğlu, and Büyüköztürk (2012) were carried out in the Turkish adaptation process of the Cognitive Load Scale (CLS), which included the translation of the items from the original language into the target language, the determination of the equivalence of the items in the original form and the draft form, and the determination of the validity and reliability of the Turkish form obtained.

Translation Form

The translation stage is reported to constitute the most important step of the adaptation process, so as stated by Erkuş (2010) and Çokluk, Şekercioğlu, and Büyüköztürk (2012), the translator was determined considering the criteria which included possessing the knowledge of the target and source languages well, knowledge of the topic related to the scale, and experience in both cultures. In this regard, a lecturer specialized in the field of curriculum and instruction in the Faculty of Education

at Pamukkale University translated the scale items from the original language to the target language, and the views of two more experts (in the foreign language and curriculum and instruction) were received for language validity.

Testing Item Equivalence

After the translation process was completed, judgmental and statistical methods were used to test the equivalence of the words and expressions in the draft form with the original scale. The "Single-Translation Method" among the judgmental methods was employed. Item equivalence is examined and evaluated according to the target language in the one-way translation method, which is the most important reason for choosing this method. In this way, in line with the common opinions of language experts who have a good command of the subject, it is possible to arrange expressions suitable for the target language into which the scale will be translated and adapt the structure of the expression in the source language to the target language (Hambleton & Bollwark, 1991; Cited in Cotiga, 2012; Erkuş, 2010). The single translation method was preferred in this respect. The Turkish translation received from the translator was assessed in terms of the vocabulary, concepts, and expressions used, and a draft form suitable for the target culture was prepared. Following this phase, two expert groups were formed consisting of lecturers from the Department of Curriculum and Instruction in the Faculty of Education at Pamukkale and Trabzon University; the translation was evaluated in terms of the concepts and expressions; and the scale was compared with the source language and evaluated. In addition, a Turkish language expert was consulted to evaluate the suitability of the Turkish translation of the draft form in terms of language. The scale items were evaluated one by one and necessary changes were made in line with the suggestions of the experts. Then the scale was administered to two students enrolled in the teaching program in the Faculty of Education at Trabzon University to evaluate the comprehensibility of the scale items as well as their suitability for the students who would be administered the scale. To collect data about item equivalence, the students were asked what each item meant. Considering how the students interpreted the items, revisions were made to the statements on the scale.

Validity Study

Construct validity

Exploratory factor analysis was performed to examine the structure of the Turkish adaptation of CLS in Turkish culture. Exploratory factor analysis aims to find new conceptually meaningful variables (factors) based on the relationships between variables by bringing together p number of related variables (Büyüköztürk, 2002; Field, 2005). In this way, it is possible to explain how the structure in question is based on the results obtained from the measurement tool created to measure an unknown structure (Erkuş, 2010).

As stated by Deniz (2007), exploratory factor analysis is a technique related to validity, and it is used for the adaptation of a scale to reveal its factors in the adapted culture. In this regard, this study aims to determine under which factors the items that make up the Turkish form of the CLS were grouped. In addition, the factor loadings of the CLS items were analyzed through factor analysis to determine the structure of the scale specific to Turkish culture.

Principle Component Analysis, which is frequently used in social sciences, was used as a factorization technique in the exploratory factor analysis. In addition, varimax orthogonal rotation was used to ensure that the correlation between factors was zeroed and thus the significance was enhanced for the interpretation of the factors; the lower limit of item eigenvalues was 1.00 for determining the number of factors (Tabachnick & Fidell, 2001; Field, 2005; Büyüköztürk, 2002).

Initially, the sample size was analyzed for the Exploratory Factor Analysis. The CLS was administered to 400 students enrolled in the Faculty of Education at Pamukkale University (PU) (n: 214) and Trabzon University (TRU) (n: 186). A total of 376 data forms TRU (n:170) and PU (n:206)

were used for exploratory factor analysis after the collected data were organized and outliers and missing values were removed. In the first round of exploratory analysis, the eight-item scale had a one-factor structure, yet the break in the Scree Plot table was found to be in the second factor. The exploratory factor analysis was conducted again with two sub-factors using the varimax process, based on the theoretical basis of cognitive load and the two sub-factor structure of the original form of the scale. At the beginning of the first round of factor analysis of CLS with two sub-factors, the Kaiser-Meyer-Olkin (KMO) coefficient, and Bartlett's test of sphericity results were performed to determine whether the data were suitable for factor analysis; these values were found to be statistically significant (KMO =.84; Bartlett's test of sphericity $\chi2$=1540,190 df =28 p<.001).

After the administration, Kaiser Meyer-Oklin's (KMO) sampling adequacy measurement was performed to test the validity of the sample size statistically. The KMO value, which can take values between 0 and 1, is considered normal between 0.5 and 0.7, good between 0.7 and 0.8, very good between 0.8 and 0.9, and excellent above 0.9 (Field, 2005). Besides, a significant level of Bartlett's test of sphericity indicates that the sample size is good for factor analysis and the correlation matrix is suitable (Tabachnick & Fidell, 2001; Field, 2005; Büyüköztürk, 2002). However, an analysis of the items showed that item 5 was included in two sub-factors and the value between the two sub-factors was less than .20, so item 5 was removed from the scale and the analysis was performed again. In the second round of the two-subfactor analysis at the beginning of the factor analysis performed on the CLS, the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity results were performed to determine whether the data were suitable for factor analysis; these values were found to be statistically significant (KMO =.81; Bartlett's test of sphericity $\chi2$=1346,343 df =21 p<.001). However, an analysis of the items showed that item 8 was included in two sub-factors and the value between the two sub-factors was .20, so item 8 was removed from the scale and the analysis was performed again. In the third round of the two sub-factor analysis at the beginning of the factor analysis performed on the CLS, Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity results were examined to determine whether the data were suitable for factor analysis; the values were found to be statistically significant (KMO =.79; Bartlett's test of sphericity $\chi2$=1086,653 df = 15 p<.001). However, an analysis of the items showed that item 1 had a value of .63 in the mental effort factor, not in the mental load factor. Item 1 was included in the mental load factor in the original scale, so the related item was removed from the scale and the analysis was performed again. In the fourth round of the two sub-factor analysis at the beginning of the factor analysis performed on the CLS, the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity results were examined to determine whether the data were suitable for factor analysis; the values were found to be statistically significant (KMO =.73; Bartlett's test of sphericity $\chi2$=908,627, df = 10 p<.001). However, an analysis of the items showed that item 2 received a value of .70 in the mental effort factor, not in the mental load factor. Item 2 was included in the mental load factor in the original scale, so the related item was removed from the scale, and analysis was performed again. In the fifth round of the two-subfactor analysis at the beginning of the factor analysis performed on CLS, Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity results were analyzed to determine whether the data were suitable for factor analysis; the values were found to be statistically significant (KMO =.642; Bartlett's test of sphericity $\chi2$=675.02 df =6 p<.001). The total Cronbach's alpha reliability value of the two-factor and four-item forms was found to be .80 as a result of the administration of the CLS to 376 students. Cronbach's alpha reliability values were .89 in the first sub-factor (2 items) and .78 in the second sub-factor (2 items). The first results of the factor analysis showed that the scale had two components with eigenvalues above 1.00. An analysis of the scree plot of the eigenvalues showed that the most significant break was in the second factor. Eigenvalue, the percentage contribution to the total variance, and the scree plot are reported to be the most commonly used criteria for the determination of the total number of factors (DeVellis, 2003). The determination of the appropriate number of factors, according to Cattel (as cited in DeVellis, 2003), is based on the criterion indicating the number of factors up to the point where the line graph takes a horizontal shape. In addition to these values, the original CLS includes two sub-factors. The CLS was developed with two main factors F1: Mental load and F2: Mental effort, so the factor analysis was limited to two components and performed again.

Table 1 demonstrates factors, factor loadings, factor eigenvalues, variance percentages explained by the factors, and Cronbach's alpha values; corrected item-total score correlations (r), common variances, and t-values of the items obtained from the factor analysis and reliability analyses, which resulted in a two-factor structure reached in five iterations.

Table 1. Factors, factor loadings, variance percentages explained by factors and item-total score correlation values in cognitive load scale (r)

Item No	F1	F2	$\overline{X}$	T	SD	r
I 3	,92		2,47	-17,883	1,409	,65*
I 4	,91		2,34	-21,075	1,513	,66*
I 6		,90	2,84	-19,768	1,374	,55*
I 7		,86	2,89	-22,071	1,504	,60*
Range	.91-.92	.86-.90	2,34 - 2,89	-17,883 and - 22,071	1,374- 1,504	,55*- ,66*
						Total
Variance %	44,976	41,267				86,243
Cronbach's alpha	.89	.78				.80

r: Item-total score correlations *sign indicates significance at .05 level. Note: for readability, factor r loadings less than .30 are not shown in the table. F1: Mental load and F2: Mental effort

Besides exploratory factor analysis (EFA), the factor structure of the CLS was also analyzed by confirmatory factor analysis (CFA). Exploratory factor analysis aims to discover the factor structure based on the relationships between variables. Confirmatory factor analysis, which examines model-data fit, tests the hypotheses about the relationship between variables (Tabachnick and Fidell, 2001). "Mental load" was the first component obtained from the analyses, and it included two items as I3 and I4. The items in this scale include "*Doing the activities in this course was troublesome for me*" and "*Doing the activities in this course was very frustrating for me*". The factor loadings of the two items in this sub-scale are between .91 and .92; the item-total score correlations are between .65 and .66, and the Cronbach's alpha internal consistency coefficient is .89. Exploratory factor analysis results showed that the second component of the CLS consisted of two items (Item no: 6 and 7). The factor loadings of the items in this factor called "mental effort" were between .86 and .90; the item-total score correlations were between .55 and .60; and Cronbach's alpha internal consistency coefficient was .78. The items in this scale included "*The way the instruction or content was presented during the course caused me to exert a lot of mental effort*" and "*I had to exert a lot of effort in completing the activity tasks or achieving the learning outcomes in this course*".

The two sub-scales explain 86.24% of the total variance. Cronbach's alpha internal consistency coefficient is .80 for the whole scale. Guttman Split Half values calculated as a test split technique to get an idea about the stability or consistency between the two halves of the scale are .88 for the "first" sub-scale, .78 for the "second" sub-scale, and .63 for the whole scale.

An analysis of Table 1 in terms of factor loading shows that factor loadings vary between .86 and .92. An analysis of the items loading on more than one factor shows that the items are generally loaded on the relevant sub-scales with significant differences (generally .30 and above). The arithmetic means of the four items range between 2.34 and 2.89 and standard deviations between 1.374 and 1.504.

In addition, the total scores obtained from the four items by the participants were ranked from the lowest to the highest for each item separately, and the lowest 27% and highest 27% groups were formed. Analyses aimed to examine whether the items distinguished these two groups from each other. This analysis showed that all the items were able to distinguish the groups significantly (p<.001).

Besides the reliability level of the two sub-scales, whether the scale was addible was also checked. The results are summarized in Table 2.

Table 2. Cronbach's Alpha and Tukey's test of additivity results for the sub-factors of the cognitive load scale

Sub-scale	Cronbach's Alpha	Source of variance	Sum of squares	Mean of squares	F	Sd	p
Mental load	.89		3,251	3,251	7,533	1	,006
		(Nonadditivity)	2,268	2,268	5,317	1	,022
Mental effort	. 78		,357	,357	,482	1	,488
		(Nonadditivity)	3,843	3,843	5,242	1	,023

An analysis of Table 2 shows that the reliability values were 0.89 for the first sub-factor and 0.78 for the second sub-factor. Reliability coefficient values above 0.70 are accepted as high reliability for the scales (Tabachnick & Fidell, 2001). Accordingly, both sub-scales have a high level of reliability, and in terms of scoring, the nonadditivity feature was P=0.22 for the mental load. With a value of P=0.23 for the mental effort sub-scale, it was concluded that the scale was a Likert-type addible scale (Tukey Nonadditivity p>.05). An analysis of the variance analysis table for the mental load factor of the Cognitive Load Scale showed that the difference between measures was statistically significant with a value of P=.006 (P<.01), and the nonadditivity feature was not statistically significant with a value of P=.022 (P>.005). With a value of P=0.022 for the mental load factor, the scale was found to be a Likert-type addible scale (Tukey Nonadditivity p>.005). In other words, the two-item mental load sub-factor is addible, but the measurements include differences. An analysis of the variance table for the mental effort factor of the Cognitive Load Scale showed that the difference between measures was not statistically significant with a value of P=.488 (P<.01) and with a value of P=.023 (P>.005), the non-additivity feature was not statistically significant. For the mental effort factor, with a value of P=0.023, the scale was concluded to be a Likert-type addible scale (Tukey Nonadditivity p>.005). In other words, the two-item mental effort sub-factor is addible, but there are no differences between the measures. In addition, Table 3 presents the correlation results for the Cognitive Load Scale total and sub-factors (mental load and mental effort).

Table 3. Correlation analysis results of scale factors

	Cognitive load scale total	Cognitive load scale total	Mental effort
Cognitive load scale total	1	,864**	,845**
Cognitive load scale total	,864**	1	,460**
Mental effort	,845**	,460**	1

P**<.01

An analysis of Table 3 shows that the Cognitive Load Scale includes two sub-scales as the mental load sub-factor and the mental effort sub-factor

To test the total sub-factors of the Cognitive Load Scale adapted by Demir and Ayvaz-Tuncel, each scale was applied to 376 individuals, and the relationship between them was analyzed by Pearson Product-Moment Correlation Analysis. As seen in Table 3, a significant and positive correlation was found between the total score of the Cognitive Load Scale adapted by Demir and Ayvaz-Tuncel and mental load (r=.864, p<.01) and mental effort (r=.845, p<.01). There was also a significant and positive relationship between mental load and mental effort (r=.460, p<.01).

Confirmatory Factor Analysis

Several fit indices in CFA are used to assess the validity of the model. The most commonly used ones are the Chi-Square Fit Test, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error (RMR or RMS), and Root Mean Square Error of Approximation (RMSEA). A ($\chi2/sd$) ratio of less than 5 calculated by CFA is considered to be an indicator of a good fit of the model with the actual data (Sümer, 2000). GFI and AGFI values of higher than .90 and RMS or standardized RMS and RMSEA values of less than .05 are expected for model-data fit. On the other hand, GFI values higher than 0.85, AGFI values higher than 0.80 and RMS values lower than 0.10 are

also accepted as criteria for model fit with actual data (Anderson and Gerbing, 1984; Marsh, Balla and McDonald, 1988).

Confirmatory factor analysis was performed to test the fit of the two-factor structure. Although model-data fit includes several statistics, $\chi2$, $\chi2/df$, RMSEA, NNFI, CFI, and GFI values are generally considered indicators (Sümer, 2000; Çokluk, Büyüköztürk, & Şekercioğlu, 2012; Hoe, 2008). The chi-square value calculated for model-data fit with the confirmatory factor analysis conducted to examine the extent to which the two-factor model of the CLS was compatible with the collected data was found to be significant ($\chi2=2,156$, sd=1, p>.01).

An analysis of the literature indicates no consensus on which fit indices should be used for the evaluation of the model, yet more than one fit index is recommended to be used together. The recommended indices include the Chi-Square fit test (χ^2), chi-square and degrees of freedom ratio (χ^2 /sd), Root Mean Square Errors of Approximation (RMSEA), Square Root Mean Square Errors Standardized (S-RMS), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI) and Comparative Fit Index (CFI). In this study, the fit indices and acceptable limit values used to determine the fit of the theoretical model to the data include a nonsignificant p-value, χ^2 / sd ratio of less than 3, indicating "good fit", and values up to 5 indicates "adequate fit". While S-RMS and RMSEA should be less than 0.10, GFI, CFI, AGFI, NFI, NNFI, and CFI should be greater than 0.90 (Byrne 1994: 147-149, Schermelleh-Engel, Moosbrugger and Müller 2003: 52, Sümer 2000: 49-74). It is recommended that the fit indices should be greater than 0.90 and the error indices should be less than 0.05. In other words, GFI, AGFI, and CFI values should be above .90 and SRMR and RMSA values should be below .05 (Schumacker & Lomax, 2004).

Table 4 demonstrates the fit indices, normal values and acceptable values used in CFA.

Table 4. The goodness of fit indices, normal values, and acceptable values used in CFA

Fit indices	Normal values	Acceptable value
$\chi2$ "p" Value	p>0.05	-
$\chi2$ /sd	<2	<5
GFI	>0.95	>0.90
AGFI	>0.95	>0.90
CFI	>0.95	>0.90
RMSEA	<0.05	<0.08
RMR	<0.05	<0.08
SRMR	<0.05	<0.08

(Schreiber, Nora, Stage, Barlow and King, 2006; Hooper, Coughlan and Mullen 2008).

Table 5 demonstrates the comparison of standard goodness-of-fit indices and research results.

Table 5. Comparison of standard goodness of fit indices and research results

Fit indices	Good fit	Acceptable fit	Fit Values obtained in the study
c^2	$0 \leq c^2 \leq 2df$	$2df \leq c^2 \leq 3df$	2.156
P value	$0.05 \leq p \leq 1$	$0.01 \leq p \leq 0.05$	.142
c^2/df	$0 \leq c^2/df \leq 2$	$2 \leq c^2/df \leq 3$	2.156
RMSEA	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.08$	0.056
RMR			0.014
NFI	$0.95 \leq NFI \leq 1.00$	$0.90 \leq NFI \leq 0.95$	0.99
CFI	$0.97 \leq CFI \leq 1.00$	$0.95 \leq CFI \leq 0.97$	0.99
GFI	$0.95 \leq GFI \leq 1.00$	$0.90 \leq GFI \leq 0.95$	0.99
AGFI	$0.90 \leq AGFI \leq 1.00$	$0.85 \leq AGFI \leq 0.90$	0.97
RFI	$0.90 < RFI < 1.00$	$0.85 < RFI < 0.90$	0.98

(Schermelleh-Engel-Moosbrugger, 2003)

A two-factor structure was analyzed for the Cognitive Load Scale. The structure examined includes two items in the cognitive load factor and two items in the mental effort factor. The model fit criteria were examined using confirmatory factor analysis and CMIN=2.156, DF=1, CMIN/DF=2.156,

p>0.001, RMSEA=.056 and χ^2/df=2.156, RMR= .014, GFI= 0.997, AGFI= 0.971, NFI= 0.99, CFI=0.99, IFI= 0.99 were obtained. Fit indices of confirmatory factor analysis showed that the Turkish version of the CLS consisted of four items and two factors, and this model showed an excellent fit in terms of theory and statistics. An analysis of the β_0 values in Table 4 showed that I4 explained factor 1 the most, while with .744, I6 explained factor 2 the least. The standardized coefficients showing the relationship between the items and their factors ranged between .74 and .90, which were all significant at the .01 level. A general analysis of model fit indices showed that with RMSEA=0.56 and χ^2/df=2.156 (Tabachnick & Fidell, 2001, Dorman & Knightley, 2006), the model showed a good fit.

Table 6 shows the standard and non-standard β coefficient values for the Cognitive Load Scale.

Table 6. Standard and nonstandard path (β0: standard path coefficients β1: nonstandard path coefficient) coefficient values for the cognitive load scale

Items	Path	Factor	β_0	β_1	S.E.	C.R.	P
m3	<---	Mental load (F1)	,887	1			<0,001
m4	<---	Mental load (F1)	,902	1,092	0,081	13,501	<0,001
m6	<---	Mental effort (F2)	,744	1			<0,001
m7	<---	Mental effort (F2)	,867	1,275	0,136	9,389	<0,001

(β_0: Standard path coefficients β_1: Nonstandard path coefficients F1: Mental load, F 2: Mental effort)

An analysis of the two-factor model tested with CFA showed that fit indices values obtained were RMSEA=.056 and χ^2/df=2.2 and RMR= .014, GFI= 0.997, AGFI= 0.971, NFI= 0. 99, CFI=0.99, IFI= 0.99, which were found within the specified limits, indicating excellent model fit. An analysis of Table 6 shows that the path coefficients of all items under Mental load (F1) and Mental effort (F 2) were found statistically significant in the confirmatory factor analysis (p<0.001). The path coefficient value obtained for item 3 was β_1= 1, β_1= 1,092 for I4, β_1= ,744 for I6, and β_1= ,867 for I7. An analysis of path coefficients showed that I4 is the item with the highest effect on F1 ($\beta0$=,90). An analysis of the standardized path coefficients shows that I7 is the item with the highest effect on F 2 (β_0=,86).
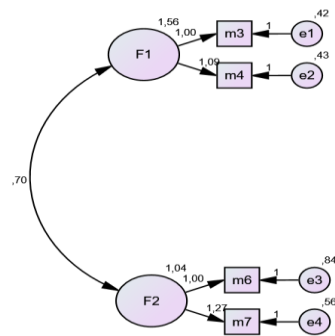
Figure 1 contains standardized path coefficients
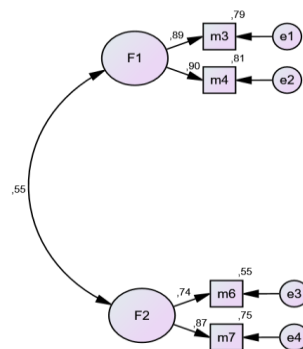
CMIN=2,156; DF=1; p=,142; CMIN/DF=2,156, RMSEA=,056; GFI=,997;CFI=,998

Figure 1. Standardized path coefficients

Figure 2 contains non-standardized path coefficients

CMIN=2,156; DF=1; p=,142; CMIN/DF=2,156, RMSEA=,056; GFI=,997;CFI=,998

Figure 2. non-standardized path coefficients

Criterion validity

At this phase, the study included a sample group (n=259) enrolled in departments of two different Education Faculties in the second semester of the 2022-2023 academic year. In addition to the Cognitive Load Scale adapted by Demir and Ayvaz-Tuncel (2023), the Cognitive Load scale developed by Dönmez, Akbulut, Telli, Kaptan, Özdemir, and Erdem (2022) was administered as the data collection tool. The Cognitive Load scale is a 13-item and three-factor scale developed by Dönmez et al. (2022) to address intrinsic, extraneous, and effective cognitive load in computer-based learning environments. It was developed after confirmation with 193 undergraduate students immediately after they attended online webinars and 99 undergraduate students after they attended face-to-face classes. The 13-item scale, the validity and reliability of which was performed on 292 participants, was found to have a three-factor structure; the factor structures were found to be valid; and the internal consistency coefficient was found 0.88, which explained 57.51% of the total variance. Cronbach's alpha internal consistency coefficients were .87 for intrinsic cognitive load, .81 for extraneous cognitive load, and .82 for effective cognitive load. In addition, confirmatory factor analysis results showed that the fit index values ($\chi2$= 119.18, RMSEA=0.069, $\chi2$/df= 1.92, SRMR= 0.0783, GFI= 0.914, AGFI= 0.971, NFI= 0.926, NNFI= 0.953, CFI= 0.962) fit the recommended criteria. Criterion validity is cross-checked by looking at the correlation of the scores obtained by the participants from the scale to be developed with both another test measuring the same behavior and a test measuring another related behavior (Büyüköztürk, 2008: 169). For this purpose, the Cognitive Load Scale (Dönmez, Akbulut, Telli, Kaptan, Özdemir and Erdem, 2022) was used to test criterion validity.

To test the Cognitive Load Scale adapted by Demir and Ayvaz-Tuncel (2023), both scales were applied to 259 individuals, and the relationship between them was analyzed by Pearson Product-Moment Correlation Analysis. As seen in Table 7, a significant and positive correlation was found between the total Cognitive Load Scale adapted by Demir and Ayvaz-Tuncel (2023), and the intrinsic cognitive load (r=.631, p<.01), extraneous cognitive load (r=.713, p<.01) and effective cognitive load (r=.546, p<.01) of the Cognitive Load Scale developed by Dönmez et al. (2022). Similarly, a significant and positive relationship was found between the mental load factor of the Cognitive Load Scale adapted by Demir and Ayvaz-Tuncel and the extraneous cognitive load factor of the Cognitive Load Scale developed by Dönmez et al. (2022) (r=.336, p<.01), and between the mental effort factor and the extraneous cognitive load factor (r=.217, p<.01).

Table 7. Correlation results between the cognitive load scale adapted by Demir and Ayvaz-Tuncel (2023) and the Cognitive load scale developed by Dönmez et al. (2022)

	Cognitive load scale adapted by Demir and Ayvaz-Tuncel (2023) total	Mental load	Mental effort	Cognitive load scale developed by Dönmez et al. (2022) total	Intrinsic cognitive load	Extraneous cognitive load	Effective cognitive load
Cognitive load scale total	1	,054	,116	,103	,631[**]	,713[**]	,546[**]
Mental load	,054	1	,376[**]	,823[**]	-,142[*]	,336[**]	-,296[**]
Mental effort	,116	,376**	1	,836[**]	-,003	,217[**]	-,088
Cognitive load scale developed by Dönmez et al. (2022) total	,103	,823[**]	,836[**]	1	-,086	,332[**]	-,229[**]
Intrinsic cognitive load	,631[**]	-,142*	-,003	-,086	1	,084	,409[**]
Extraneous cognitive load	,713[**]	,336[**]	,217**	,332[**]	084	1	-,082
Effective cognitive load	,546**	-,296[**]	-,088	-,229**	,409**	-,082	1

P**<.01, P*<.005

Test-retest reliability

The test-retest method was used to statistically test the stability of the Turkish form of the CLS in terms of the qualities it measures over time. Test-retest reliability aims to test the stability of a measurement tool in a certain time interval (Çokluk et al., 2012; Erkuş, 2010). The test-retest reliability coefficient of the scale was determined by administering it to 342 students who were enrolled at the Faculty of Education in two universities in Turkey within a six-month interval. Pearson Product-Moment correlation coefficient was performed to test the stability between the students' scores from both administrations. Accordingly, [r=.304, p<.001] was found between the two administrations of the CLS. In addition, confirmatory factor analysis was performed on the Cognitive Load Scale again, and the values related to the measurement model were found (CMIN: .067, df:1, CMIN/df: .067, NFI: 1,000, GFI: 1,000, RFI: .999, CIFI:1,000, RMSEA:. 000).

DISCUSSION, INTERPRETATION AND CONCLUSION

Knowledge of pre-service teachers' cognitive load within the scope of the activities carried out in the teaching principles and methods course is believed to contribute to the design of the teacher education process to be provided to them. For this reason, this study followed a way to adapt a reliable and valid scale to contribute to the measurement of pre-service teachers' cognitive load.

Many fit indices such as the Chi-Square fit test ($\chi 2$), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI) and Root Mean Square Error of Approximation (RMSEA) are used in the process of the determination of cognitive load tendencies (Şimşek, 2007; Hoe, 2008).

The Cognitive Load Scale was developed by Hwang, Yang, and Wang (2013). Considering the original scale, a two-subfactor structure was conducted in the scale adaptation study. In this respect, as a result of the exploratory factor analysis, Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity results were analyzed and these values were found to be statistically significant (KMO =.642; Bartlett's test of sphericity $\chi 2$=675,02 df =6 p<.001).

According to Klein (1998) and Wiersma (2000), reliability is the consistency of a measurement tool in any measurement. Calculation of Cronbach's alpha is the most commonly used reliability method in studies (Dorman & Knightley, 2006; Smolleck, Zembal-Saul & Yoder, 2006; Johnson, Stevens & Zvoch, 2007). Cronbach's alpha internal consistency coefficient was found .80 for

the total scale. In addition, Cronbach's alpha reliability coefficients were calculated as .89 in the first sub-factor and .78 in the second factor, thus a reliable measurement tool with four items and two factors was obtained.

Confirmatory factor analysis was employed to test the fit of the two-factor structure. Although many statistics are available for model-data fit, $\chi2$, $\chi2/df$, RMSEA, NNFI, CFI, and GFI values are generally considered indicators (Sümer, 2000; Çokluk, Büyüköztürk, & Şekercioğlu, 2012; Hoe, 2008). The chi-square value calculated for model-data fit with the confirmatory factor analysis conducted to examine the extent to which the two-factor model of the CLS was compatible with the collected data was found ($\chi2=2,156$, sd=1, p>.01). When the two-factor model tested as a result of the CFA was analyzed, it was found that the fit index values obtained with RMSEA=.056 and $\chi2/df=2.156$ and RMR= .014, GFI= 0.997, AGFI= 0.971, NFI= 0. 99, CFI=0.99, IFI= 0.99 complied with the recommended criteria.

The standardized coefficients showing the relationship between the items and their factors ranged between .42 and .84, and all of them were significant at the .01 level. In general, the model showed a good fit with RMSEA=0.56 and $\chi2/df=2.156$ (Tabachnick & Fidell, 2001; Dorman & Knightley, 2006). The results of the confirmatory factor analysis conducted to test the original factor structure of the CLS, which was also supported by expert opinions, confirmed that the four items in the scale showed a valid structure on the faculty of education students. These values indicate the adequacy of the data fit of the model (Kelloway, 1998; Heubeck & Neill, 2000; Corral & Calvete, 2000; Ingles, Hidalgo & Mendez, 2005; Şimşek, 2007; Hoe, 2008).

In line with the characteristics of the items in the factors, the first factor was determined as "Mental load" and the second factor was determined as "Mental effort". This scale, which is valid and reliable with the results obtained, is also a reliable measurement tool adapted by confirmatory factor analysis in our country to determine education faculty students' cognitive load tendencies.

Considering the results of the validity and reliability studies conducted with education faculty students in this study, the scale has the features to measure the cognitive load tendencies of education faculty students with a two-factor structure:

- It has a valid and reliable structure,

-The results obtained from the actual administration of the scale can provide the necessary feedback on students' self-perception of their cognitive load tendencies,

-The adapted measurement tool can be examined at a meta-analytic level in future administrations and studies including different samples,

- "CLS" is considered to be used in studies involving different types of research to determine the self-perceptions of education faculty students about their cognitive load tendencies.

Ethical Statement: Ethics Committee Permission: Trabzon University, Social and Human Sciences Scientific Research and Publication Ethics Histor: 16.05.2022 and Number: E-81614018-000-2200018936

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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An Examination of Parental Support for Children's Drawing Skills

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Abstract

The purpose of this study is to examine the factors influencing parental support for children's drawing skills. Using a mixed-methods approach, the "Parental Support for Children's Drawing Skills Scale" was employed as a quantitative data collection tool, while a semi-structured interview form was utilized for qualitative data. The study sample consists of parents of 3-6-year-old children attending preschools affiliated with the Ministry of National Education in the city center of Van during the 2023-2024 academic year. A total of 25 schools were selected based on districts and neighborhoods with varying rental levels, and 736 parents were included in the study group through random sampling. For the qualitative portion of the study, maximum variation sampling, a type of purposive sampling, was chosen to form the study group, and 8 parents with different socioeconomic and educational backgrounds were included. Descriptive analyses, independent samples t-test, and ANOVA were applied for the quantitative data analysis, while content analysis was used for qualitative data. The study observed that parents were more inclined to praise their children rather than engage in drawing activities with them. No significant effect was found in the total scores on the overall scale and sub-dimensions based on the gender variable of the parents. However, significant differences were identified in both the overall scale and sub-dimensions based on parents' educational backgrounds. Furthermore, the analysis of the age variable revealed a significant difference in the resource support sub-dimension in favor of parents aged 31-40, while a significant difference was observed in the collaborative drawing sub-dimension in favor of younger parents. Qualitative analysis revealed that parents support their children's artistic development through diverse methods, including facilitating access to artistic materials, creating designated workspaces, displaying their children's artwork, engaging in joint artistic activities, introducing novel techniques, providing verbal guidance, and offering both process-oriented and product-oriented praise to enhance self-confidence. It would be beneficial to further investigate the types and levels of parental support needed by children of different age groups when engaging in drawing activities.

Keywords: Children's Drawing Skills, Parental Support, Children's Drawings

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INTRODUCTION

Student success is a process shaped by the complex interaction of many factors, including family, teachers, and the environment, not limited to the school setting (Skinner et al., 2022). This complex interaction indicates that various factors contributing to student success are interconnected, with each playing a significant role. Studies have indicated that when parents are actively involved in their children's education, it has a considerable and positive effect on their academic performance. (Barnard, 2004; Boonk et al., 2018; Cosso, Suchodoletz, Yoshikawa, 2022; Grolnick & Slowiaczek, 1994; Patall, Cooper, Robinson, 2008; Desforges & Abouchaar, 2003). This has become an important focus for education policies, educators, and researchers (Boonk et al., 2018; Patall et al., 2008).

Parents can participate in their children's education in various ways. In this context, parents can take an active role by interacting with the school and supporting learning at home (Boonk et al., 2018). Specifically, parents' regular communication with the school and assistance with homework can increase children's engagement in lessons and strengthen their motivation to learn. Additionally, encouraging learning at home and organizing activities related to children's interests can enrich the learning experience and promote more active participation in the learning process (Albez & Akan, 2022). In this way, parental involvement in the educational process can contribute to children having a successful education and development experience. According to Grolnick and Slowiaczek (1994), home and school stand out as fundamental institutions that socialize and educate children. Parental involvement serves as a bridge between these important institutions, linking home and school environments. In this context, parents' active participation at home and school plays a critical role in providing a holistic educational experience by supporting children's social, emotional, and academic development.

Drawing is considered not only an activity that children enjoy but also an extremely beneficial one for them (Burkitt, Jolley, & Rose, 2010). These benefits encompass cognitive, social, and emotional development areas. The act of drawing by children is a social and cultural activity influenced by the beliefs of adults and peers and the rules of the environment in which they are situated (Cameron et al., 2020).

Family and school provide children with different environments that influence their experiences and drawings. In this regard, how much importance parents and teachers place on children's drawings, along with their perceptions and expectations, can greatly influence children's development and their methods of self-expression (Cameron et al., 2020). In particular, when children start preschool, there is a noticeable variability in their drawing skills during primary school and subsequent educational stages. This variability can be explained, among other factors, by parental support related to drawing.

Around the age of 2, children begin to draw with scribbles. Although drawings usually consist of scribbles during this process, they become more distinct as children's skills develop over time (Hiçyılmaz, 2023). This early drawing stage usually takes place at home, and parental support and influence are quite important during this process. The environment provided at home can offer children the opportunity to experiment with various drawing materials, try different techniques, and discover their own creative expressions, providing the essential elements necessary for developing their drawing skills. Therefore, the role of parents is critical in strengthening children's drawing skills.

Parental support refers to the efforts made to develop children's drawing abilities; this support includes providing drawing materials, participating in joint drawing activities, offering guiding feedback, and encouraging children's drawings with praise (Groot et al., 2023). Such support not only enhances children's artistic expression abilities but also fosters their self-confidence and creativity. In particular, the encouragement and assistance parents offer in drawing is crucial for fostering children's artistic skills and enhancing their capacity for self-expression (Mendoza Straffon et al., 2024).

Parents should avoid rote drawing, provide visual materials appropriate to developmental stages, and ensure that children's questions about artistic activities are not left unanswered in order to create an environment that helps develop children's creative potential (Oğuz, 2010). This approach helps children build their self-confidence, discover their talents, and realize their potential. Such an environment can be described as a place where children can share their experiences, receive unconditional love and support, and have their self-confidence strengthened through positive feedback.

A review of the literature reveals several studies focused on various aspects of children's drawing experiences. These include investigations into drawing activities conducted with fathers (Acer, Baş, & Teke, 2022), factors influencing children's drawing experiences (Oğuz, 2010), and the influence of both teachers and parents on children's drawing activities (Anning, 2002; Ring, 2006; Rose, Jolley, & Burkitt, 2006). Moreover, studies have explored the attitudes and practices that influence children's drawing experiences both at home and in school (Burkitt et al., 2010; Lesinskienė et al., 2018), the influence of teachers on children's art design (Madani et al., 2015), as well as the impact of parents and cultural factors on the development of children's drawing skills (Straffon et al., 2024). Studies have also explored children's perspectives on their drawing experiences (Pillar, 1998). Many investigations have focused on the impact of parental involvement on students' academic success (Boonk et al., 2018; Cosso et al., 2022; Grolnick & Slowiaczek, 1994; Patall et al., 2008). Within this context, alongside research examining the effects of parental involvement on academic achievement, there are also research studies that investigate how parents and various other factors affect children's drawings. However, the specific nature of parental support in relation to drawing and its effect on children's drawing skills has not been thoroughly investigated (Groot et al., 2023). Therefore, this study aims to address gaps in the existing literature by providing a deeper understanding of the nature of parental involvement that influences children's drawing skills. This mixed-methods research seeks to answer the following questions regarding parental support for children's drawing skills:

1. What is the extent of parental support for children's drawing skills?

2. Does parental support for children's drawing skills vary based on the parents' gender, educational background, and age?

3. What are the experiences of parents in supporting their children's drawing skills?

METHOD

This study employed a mixed-methods approach to investigate parental support for children's drawing skills. The mixed-methods approach is a research strategy that combines qualitative and quantitative research methods simultaneously. This strategy aims to achieve more robust and comprehensive results by utilizing both methods in the data collection and/or data analysis stages (Creswell & Plano Clark, 2015). A sequential explanatory design was selected. In this framework, the quantitative data collected in the first phase were further detailed and interpreted with the qualitative data collected in the second phase. In the first phase of the research, a general survey model, which aims to describe the current situation as it is (Karasar, 2012), was preferred. In the second phase, a phenomenological design was used to uncover experiences and meanings related to the phenomena (Yıldırım & Şimşek, 2011).

Study Group

The study group consisted of parents of children aged 3-6 attending preschools affiliated with the Ministry of National Education (MEB) in Van city center during the 2023-2024 academic year. Schools were selected using a convenience sampling method, considering districts and neighborhoods within the city center of Van that vary in rent levels (low, medium, high). A total of 25 schools were identified. Parents of children attending these selected schools were included in the study group through random sampling, with participation based on voluntary consent. Ethical approval for the

study was granted by the Ethics Committee of the Social and Human Sciences Faculty at Van Yüzüncü Yıl University (Ethics Approval No: 22058, dated 03.04.2024). Parents were contacted through the school administration, and informed consent was obtained from all participants prior to their inclusion in the study

In the qualitative phase of the study, the study group was formed using the maximum variation method, a purposive sampling technique. This method involves including individuals or situations in the sample that vary according to specific characteristics, criteria, and features (Creswell, 2016; Patton, 2018). Accordingly, eight parents with different socioeconomic and educational backgrounds were included in the study group. The demographic information of the participants who contributed to the research is presented in Table 1.

Table 1. Demographic Characteristics of the Study Group

Variables		Quantitative Sample	Qualitative Sample
Gender	Woman	403	4
	Man	333	4
Age Range	20-30	51	3
	31-40	382	3
	41-50	278	2
	51 and above	25	
Educational Background	İlliterate	54	1
	Primary School	161	1
	Secondary School	128	1
	High School	176	2
	Bachelor's Degree	158	1
	Master's Degree	38	1
	PhD	21	1
Total		736	8

Data Collection Tools

In this study, the "Parental Support for Children's Drawing Skills Scale" was employed as the quantitative data collection instrument. The scale, originally developed by Groot et al. (2023) and adapted to Turkish culture by Hiçyılmaz (2023), is a 7-point Likert-type tool consisting of 34 items across 4 subdimensions. The Cronbach's Alpha reliability coefficients were found to be .731 for the "Resource Support" dimension, .829 for "Collaborative Drawing," .873 for "Scaffolding," .863 for "Praise," and .895 for the overall scale. Additionally, confirmatory factor analysis confirmed that the scale is structured around four distinct dimensions.

A semi-structured interview form was utilized as the qualitative data collection instrument in this study. The interview form, consisting of six questions, was developed based on the quantitative findings and designed to obtain in-depth information on how parents support their children's drawing skills. To assess the appropriateness and content validity of the interview questions, the form was sent to two experts in the field of Visual Arts education, both holding the academic title of Associate Professor. Based on their feedback, some questions were revised to include clarifying examples, while unnecessary questions were removed, and the interview form was finalized. To evaluate the functionality and clarity of the prepared interview form, a pilot study was conducted with two parents. The responses from the pilot interviews were analyzed, and it was determined that the interview questions were clear and understandable, making the form applicable in its current state. Additionally, the interviews were audio-recorded to ensure accurate data collection and analysis. The interviews were conducted on a daily basis and held face-to-face with the participants who were accessible for the study.

Data Collection Process

The "Parental Support for Children's Drawing Skills Scale" was digitized and administered after securing the required permissions. In the following phase, the purpose of the study was explained

to the parents, who were then invited to complete the digital version of the questionnaire. The qualitative data were gathered through interviews conducted with parents from the study group who consented to participate. These interviews, guided by a semi-structured interview form, lasted an average of 35 minutes.

Data Analysis

In the initial phase of data analysis, skewness and kurtosis values for the scale scores were examined. The results indicated that the skewness values for the subdimensions and the overall scale ranged from -.044 to .125, while the kurtosis values ranged from -.091 to -.607. Values within the range of -1.5 to +1.5 suggest that the distribution is normal (Tabachnick & Fidell, 2013). After establishing normality, descriptive analyses, independent samples t-tests, and ANOVA were conducted in line with the research objectives. Additionally, the formula (number of options - 1) / number of options was used to determine the level of parental agreement with the items on the scale.

The qualitative data of the study were analyzed using content analysis, with codes VE1 and VE2 assigned for male parents and VK1 and VK2 for female parents. Participant opinions were coded and processed with an emphasis on coherence and logical integrity. The coding was conducted by two researchers specializing in visual arts education. They developed codes such as 'Access to Artistic Materials,' 'Parental Involvement in the Child's Artistic Activities,' 'Introduction of New Artistic Techniques,' and 'Process-Oriented Praise.' These codes were then categorized under the theme of parents' experiences in supporting their children's drawing skills, based on commonalities. In the next stage, the consistency of coding between the two researchers was evaluated. The reliability value was calculated to be approximately 87% using the formula proposed by Miles and Huberman (2019).

FINDINGS

The first research question seeks to address, "To what extent do parents support their children's drawing skills?" In this context, the mean ($\bar{X}$) and standard deviation (S) values of the scores obtained by parents on the scale are shown in Table 2.

Table 2. Descriptive Statistics of the Parental Support for Children's Drawing Skills Scale

No	Dimensions	Scale Item	$\bar{X}$	Sd
M1	Resource Support	"Does your child have access to a wide variety of drawing utensils at home (for example, colored pencils, markers, paint, crayons, charcoal, coloring books, etc.)?"	5,03	1,74
M2		"How often do you provide your child with books, magazines, (digital) drawing games, or other material as drawing inspiration?"	3,94	1,66
M3		"Do you (or would you) allow your child to draw in different places within the house (e.g., at the dining table, on the floor, etc.)?"	4,82	1,91
M4		"How often do you display your child's drawings in the house"	3,84	1,69
Total			4,41	1,20
M5	Joint Drawing	"How often do you encourage your child to draw by suggesting to draw together?"	3,47	1,65
M6		"How often do you sit with your child while he/she is drawing?"	3,51	1,51
M7		"How often do you pay attention to what your child is drawing?"	4,17	1,69
M8		"How often do you draw together with your child if he/she asks you to do so?"	4,15	1,80
Total			3,82	1,29
M9	Scaffolding	"(When your child draws,) how often do you help to improve his/her drawing skills?"	3,91	1,81
M10		"(When your child draws,) how often do you help to draw certain things by demonstrating it?"	3,82	1,72
M11		"(When your child draws,) how often do you make verbal suggestions on how to draw certain things?"	4,02	1,72

Total				3,92	1,49
M12		"How often do you praise your child while he/she is drawing?"		5,12	1,65
M13	Praise	"How often do you praise your child when he/she has completed a drawing?"		5,20	1,60
M14		"Do you praise your child also if his/her drawing is not so good?"		5,04	1,75
Total				5,12	1,45

According to Table 2, the "Resource Support" subdimension ($\bar{x}$= 4.41) is observed at a "sometimes" level, the collaborative drawing subdimension ($\bar{x}$= 3.83) is at a "sometimes" level, the guiding support sub-dimension ($\bar{x}$= 3.92) is also at a "sometimes" level, and the praise subdimension ($\bar{x}$= 5.12) is observed at a "frequently" level. Additionally, the responses of participants to the question, "How often do you praise your child when they finish a drawing?" were found to be at a "frequently" level ($\bar{x}$= 5.12), whereas their responses to the question, "How often do you encourage your child to draw by suggesting to draw together?" were determined to be at a "sometimes" level ($\bar{x}$= 3.47). These findings suggest that parents are generally more inclined to praise their children rather than engage in drawing activities together.

The second sub-problem of the study is defined as, "Does parental support for children's drawing skills vary according to parents' gender, educational level, and age?" In this context, an independent samples t-test was applied to determine whether parental support for children's drawing skills differs based on the gender variable of the parents. The analysis results are displayed in Table 3.

Table 3. Independent Samples t-Test Results for the Parental Support for Children's Drawing Skills Scale by Gender

Dimensions	Gender	N	X	S	t	p
Resource Support	Woman	403	4,4398	1,22865	,758	,448
	Man	333	4,3724	1,16642		
Joint Drawing	Woman	403	3,8207	1,32662	-,077	,939
	Man	333	3,8281	1,24680		
Scaffolding	Woman	403	3,9578	1,51413	,813	,417
	Man	333	3,8679	1,46988		
Praise	Woman	403	5,1886	1,37889	1,371	,171
	Man	333	5,0400	1,52963		
Overall Scale	Woman	403	4,3201	1,02851	,899	,369
	Man	333	4,2518	1,02211		

The findings in Table 3 indicate that the gender of the parents has no significant impact on the total scores from the overall scale or its subdimensions. ["Resource Support" (t=0.758; p>.05), "Joint Drawing" (t=-0.077; p>.05), "Guiding Support" (t=0.813; p>.05), "Praise" (t=1.371; p>.05), and "Overall Scale" (t=-0.899; p>.05)]. These results indicate that the gender of the parents does not statistically significantly affect their support for their children's drawing skills.

Table 4 presents the results of the one-way analysis of variance (ANOVA), conducted to assess whether parental support for children's drawing skills differs based on the parents' educational level.

Table 4. One-Way ANOVA Results for the Parental Support for Children's Drawing Skills Scale by Educational Level

Dimensions	Groups	N	$\bar{X}$	S.s	sd	F	p	Dunnett's C difference
Resource Support	1- İlliterate	54	3,64	1,254				
	2- Primary School	161	4,30	1,275				
	3- Secondary School	128	4,37	1,305	6/729	5,888	,000	1-2;1-3;1-4 1-5;1-6;2-7
	4-L High School	176	4,47	1,211				
	5- Bachelor's Degree	158	4,61	1,009				
	6- Master's Degree	38	4,66	,802				
	7- PhD	21	4,90	,718				
Joint Drawing	1- İlliterate	54	3,24	1,173				
	2- Primary School	161	3,83	1,447				
	3- Secondary School	128	4,20	1,383	6/729	4,580	,000	1-3;1-4;3-5
	4-L High School	176	3,92	1,283				
	5- Bachelor's Degree	158	3,66	1,106				
	6- Master's Degree	38	3,61	,977				
	7- PhD	21	3,85	,800				
Scaffolding	1- İlliterate	54	3,57	1,329				
	2- Primary School	161	4,07	1,587				
	3- Secondary School	128	4,22	1,543	6/729	5,292	,000	2-7;3-5;3-6 3-7;4-5;4-6 4-7
	4-L High School	176	4,13	1,594				
	5- Bachelor's Degree	158	3,66	1,242				
	6- Master's Degree	38	3,36	1,209				
	7- PhD	21	3,02	1,258				
Praise	1- İlliterate	54	4,35	1,761				
	2- Primary School	161	5,18	1,638				
	3- Secondary School	128	5,31	1,499	6/729	3,383	,000	1-2;1-3;1-4
	4-L High School	176	5,25	1,502				
	5- Bachelor's Degree	158	5,04	1,096				
	6- Master's Degree	38	5,06	,747				
	7- PhD	21	5,13	1,014				
Overall Scale	1- İlliterate	54	3,66	,856				
	2- Primary School	161	4,31	1,156				
	3- Secondary School	128	4,49	1,080	6/729	4,946	,003	1-2;1-3;1-4 1-5;1-6
	4-L High School	176	4,41	1,088				
	5- Bachelor's Degree	158	4,23	,834				
	6- Master's Degree	38	4,17	,681				
	7- PhD	21	4,24	,651				

The analysis in Table 4 shows a significant difference in the mean scores of the "Resource Support" subdimension based on the parents' educational levels (F= 5.888; p<.05). To identify the source of this difference among the groups, a Post Hoc analysis was conducted using the Dunnett C test. The results indicated that the difference favors those with higher educational levels. This difference was observed between the 1-2, 1-3, 1-4, 1-5, 1-6, and 2-7 educational level groups. The findings indicate a strong correlation between parents' educational level and the resource support they offer to their children. This indicates that as the educational level of parents increases, so does their capacity to support their children. In other words, parents with higher educational levels tend to offer more resources and support to their children.

A significant difference was observed in the mean scores of the "Joint Drawing" subdimension based on the parents' educational levels (F= 4.580; p<.05). Post Hoc analysis conducted to identify the source of this difference revealed that the difference favors those with higher educational levels. This difference was observed between the 1-3, 1-4, and 3-5 educational level

groups. A detailed examination of the mean scores in the 'Joint Drawing' subdimension shows that as the educational level increases up to middle school, the mean scores also increase. However, from high school to the doctoral level, there is a decrease in mean scores as the educational level rises. These findings suggest that parents' educational level has a significant impact on their 'Joint Drawing' behaviors.

A significant difference was identified in the mean scores of the "Scaffolding" subdimension based on the parents' educational levels (F= 5.292; p<.05). Post Hoc analysis was conducted to determine the source of this difference, revealing that it occurs between the 2-7, 3-5, 3-6, 3-7, 4-5, 4-6, and 4-7 educational level groups. A detailed examination of the mean scores in the 'Scaffolding' subdimension shows that as the educational level increases up to middle school, the mean scores also increase. However, from high school to the doctoral level, there is a decline in mean scores as the educational level rises.

A significant difference was found between the mean scores of parents in the "Praise" subdimension and their educational levels (F= 3.383; p<.05). Post Hoc analysis was conducted to determine the source of this difference, revealing that it occurs between the 1-2, 1-3, and 1-4 educational level groups. The findings suggest a relationship between parents' educational level and the praise they give to their children's drawings. It is noteworthy that the mean scores of parents with no formal education are significantly lower compared to those of other educational levels.

When Table 4 is examined in terms of the overall scale, a significant difference is observed between the mean overall scale scores of parents and their educational levels (F= 4.946; p<.05). Post Hoc analysis was conducted to identify the source of this difference, revealing that it occurs between the 1-2, 1-3, 1-4, 1-5, and 1-6 educational level groups. A detailed examination of the overall scale mean scores shows that the mean scores of parents with no formal education are significantly lower compared to those of other educational levels.

Table 5 presents the results of the one-way analysis of variance (ANOVA) conducted to assess whether parental support for children's drawing skills differs based on the parents' age.

Table 5. One-Way ANOVA Results for the Parental Support for Children's Drawing Skills Scale Based on Age Groups

Dimensions	Groups	N	$\bar{X}$	S.s	sd	F	p	Difference (LSD)
Resource Support	20-30	51	4,07	1,244				
	31-40	382	4,50	1,186				
	41-50	278	4,40	1,195	3/732	3,872	,009	
	51 and above	25	3,86	1,197				1-2;2-4
Joint Drawing	20-30	51	4,14	1,236				
	31-40	382	3,91	1,306				
	41-50	278	3,67	1,272	3/732	3,017	,029	
	51 and above	25	3,63	1,184				1-3;2-3
Scaffolding	20-30	51	4,38	1,279				
	31-40	382	3,88	1,439				
	41-50	278	3,89	1,614	3/732	1,756	,154	
	51 and above	25	3,85	1,233				
Praise	20-30	51	5,16	1,234				
	31-40	382	5,09	1,450	3/732			
	41-50	278	5,18	1,468		,703	,550	
	51 and above	25	4,76	1,668				
Overall Scale	20-30	51	4,39	,909				
	31-40	382	4,33	1,043	3/732			
	41-50	278	4,25	1,017		1,194	,311	
	51 and above	25	3,99	1,063				

Table 5 indicates a statistically significant difference in the mean scores of the "Resource Support" subdimension among different age groups of parents (F= 3.872; p<.05). To more precisely identify the source of this difference, a Post Hoc analysis was conducted using the LSD test. The

results indicate that this significant difference occurs between the 1-2 and 2-4 age groups, favoring parents in the 31-40 age group. After the 31-40 age group, a decrease in mean scores is observed. This suggests that parents in the 31-40 age group have more access to resources, and this support tends to diminish as age increases.

A significant difference was observed in the mean scores of the "Joint Drawing" subdimension among various age groups of parents ($F= 4.580$; $p<.05$). Post Hoc analysis conducted to identify the source of this difference revealed that it occurs between the 1-3 and 2-3 age groups, favoring the younger age group. These findings indicate that parents' average age has a significant impact on their "Joint Drawing" behaviors.

The one-way analysis of variance results shown in Table 5 indicate that there are no statistically significant differences between the age groups and the mean scores of parents in the "Overall Scale," "Scaffolding," and "Praise" subdimensions (respectively $F= 1.194$; $F= 1.756$; $F= 0.703$, $p>0.05$).

The third research question aims to address, "What are parents' experiences in supporting their children's drawing skills?" In this context, a content analysis was carried out to explore parents' perspectives on their experiences in supporting their children's drawing abilities. The results of this analysis are shown in Table 6.

Table 6. Parents' Experiences in Supporting Their Children's Drawing Skills

Kodlar	Direct Quotations from Interviewees
Access to Art Materials	"In our home, my child has access to various materials such as colored pencils, crayons, paints, and paper for drawing." VE1 "I provide art materials that are appropriate for my child's age and interests." VK4
Determination of Workspaces	"Yes, I give my child the freedom to draw in different areas. However, we set certain rules and boundaries in some places. For example, I tell them to be careful when drawing at the dining table and not to draw on the walls." VE2 "I allow drawing on the table and the floor. When using watercolor, I tell them not to stain the carpet and clothes and to clean up the workspace after finishing." VK2
Display of Works	"I sometimes display my child's drawings on the refrigerator." VE4 "I leave it up to them to decide whether to display their drawings. I share them with family members on social media. There's no specific area limitation at home; they can hang them wherever they want." VK3
Parental Involvement in Child's Artistic Activities	"We sometimes draw together." VE3 "I am usually happy to paint with my child and gladly accept the opportunity to do so." VK1
Introduction of New Artistic Techniques	"I support my child by demonstrating new techniques and offering different materials." VK2 "I showed him how to do color transitions." VE3
Determining Work Topics	"To support my child's artistic development, we choose drawing subjects together, considering his interests and abilities. For example, because he loves nature, we often work on nature scenes, animals, and plants." VK4 "Sometimes we sit together and discuss what topics he wants to work on." VE3
Verbal Guidance and Direction	"I believe that direct guidance is not appropriate. I usually don't guide him so that his imagination can develop and he can express himself comfortably. However, if he wants, I guide him by giving indirect hints." VK3 "When guiding my child, I provide hints." VE4
Process-Oriented Praise	"The other day, he worked on a drawing for hours, and I praised him for his effort and patience during this process." VK3 "When I notice that he doesn't give up even in challenging moments, I praise his determination and perseverance." VE1
Product-Oriented Praise	"I appreciate him when he completes his drawings." VK2 "Last week, I provided feedback on a painting he completed, saying, 'This looks really amazing, and you've used the colors beautifully!'" VE1
Self-Esteem Boosting Praise	"Appreciating my child's work gives him the opportunity to boost his confidence in his talents and abilities." VK4 "Praising every effort and work he does increases his self-confidence and helps him develop his artistic skills." VE4

When examining parents' views on their experiences in supporting their children's drawing skills as presented in Table 6, it is observed that these experiences are categorized under the following headings: access to art materials, determination of workspaces, exhibition of artworks, parental involvement in artistic activities, introduction of new artistic techniques, selection of topics, verbal guidance and direction, process-focused praise, product-focused praise, and confidence-boosting praise. These findings suggest that parents employ various methods to support their children's artistic development.

DISCUSSION, CONCLUSION, RECOMMENDATIONS

In preschools, the act of drawing by children aged 3-6 is recognized as more than just a process of developing basic motor skills; it is considered a significant activity that reveals how children perceive and express both their personal experiences and the world around them (Bonilla-Sánchez et al., 2022). In this process, parental involvement is a critical factor in supporting the child's development and school life (Albez & Akan, 2022). Parents' active participation enhances children's academic achievements while playing a crucial role in fostering their social, emotional, and psychomotor development. Specifically, the perceptions and attitudes of both parents and educators toward drawing activities influence how children engage with these creative tasks (Cameron et al., 2020; Rose et al., 2006). Within this framework, the current research seeks to explore how parents support the development of their children's drawing abilities. The analysis of the collected data revealed that the mean total score for the "Resource Support" subdimension was 4.41, for the "Joint Drawing" subdimension was 3.83, for the "Scaffolding" subdimension was 3.92, and for the "Praise" subdimension was 5.12. A similar finding was reported in a study conducted by Straffon et al. (2024), which also indicated that parents are more inclined to praise their children rather than engage in drawing with them. In the qualitative aspect of the study, an examination of parents' experiences in supporting their children's drawing skills revealed that they provided feedback in the form of process-focused praise, product-focused praise, and confidence-boosting praise. This behavior can be seen as positive in terms of boosting children's self-confidence and maintaining their motivation. Nevertheless, it is important to recognize that continuous praise can elevate external motivation while potentially diminishing children's intrinsic motivation.

Upon analyzing the variable of parental gender, the study revealed no significant impact on the total scores from the overall scale or its subdimensions. This result indicates that gender does not play a significant role in parents' support for their children's drawing skills. In other words, both mothers and fathers are equally effective in enhancing their children's drawing abilities.

In this study, significant differences were found in the overall scale and its subdimensions according to the variable of parents' educational background. Notably, a strong relationship was identified between parents' educational level and the resource support they provide to their children. This finding indicates that as parents' educational level increases, their capacity to support their children also improves. Therefore, it can be said that parents' educational level is an important factor in determining the quantity and quality of the support provided to children. In the qualitative part of the study, it was particularly found that parents provided support in terms of access to artistic materials, determining workspaces, and exhibiting their children's work. Ring (2006) notes in his research that when children have easy access to drawing materials and spaces where they can draw, their frequency of drawing increases. Providing the necessary resource support is crucial for children to start drawing, as it forms the foundation for this activity. However, simply providing resource support is not enough; different types of support are also needed to encourage children to actually begin drawing (Groot et al., 2023).

In the overall scale, as well as in the subdimensions of joint drawing, scaffolding, and praise, a gradual increase in average scores was observed as the educational level increased up to middle school. However, from high school onwards, up to the doctoral level, a decline in average scores was noted. This finding suggests that the amount and quality of support provided by highly educated parents to their children may vary over time. Further research is needed to clarify the reasons for this

decline. Understanding how and why highly educated parents modify their support for their children is crucial for developing educational policies and support programs aimed at families.

In the study, an analysis based on parents' age revealed a significant difference in favor of parents aged 31-40 in the resource support subdimension. This finding indicates that parents in this age group have greater access to resources. Additionally, it was observed that this support decreases with age. Another noteworthy result of the study is that the average scores of younger parents aged 20-30 are lower than those of parents aged 31-40. Possible reasons for younger parents receiving less support include a lack of experience or challenges in adapting to the parenting role. In the joint drawing subdimension, a significant difference was found in favor of younger parents among the age groups. Specifically, as age increases, there is a decrease in average scores for joint drawing. This suggests that younger parents may be more active in their interactions with their children. Factors such as increasing responsibilities and time constraints with age may explain this decline. Additionally, no statistically significant difference was found between age groups in the overall scale, scaffolding, and praise subdimension scores. Based on these findings, it is recommended to offer guidance and support programs to help younger parents develop their parenting skills. For older parents, it is suggested to organize guidance and training programs to enhance their time management and coping skills with increasing responsibilities.

The study group was limited to parents of children aged 3-6 in the city center of Van. It would be beneficial to examine what type and level of parental support children of different age groups need while drawing. Additionally, it is known that parental support varies according to the parents' cultural and socioeconomic status (Straffon et al., 2024). Accordingly, it is suggested that future research replicate this study with a larger, more diverse sample, including parents of children from various age groups across Turkey.

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Peer Bullying Experiences of Students Attending Multigrade and Transported Primary Schools

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Abstract

This qualitative research study investigated the experiences and perceptions of peer bullying among students attending multigrade and transported primary schools (TPS) in Tokat, Turkey. Data were collected through interviews with 19 students from three multigrade village schools and 12 students from three TPSs. Findings revealed a stark contrast in peer bullying prevalence between the two school types. Bullying was rare in multigrade classrooms, while TPS students reported frequent exposure to bullying, both during their commute and on school grounds. Students highlighted the challenges of daily travel, including early separation from families and extended time spent with peers, as contributing factors to bullying in TPS settings. Conversely, the close-knit environment of multigrade classrooms appeared to discourage bullying behaviors. This study illuminates the influence of school structure and organization on peer bullying dynamics, suggesting the need for targeted interventions to address the unique vulnerabilities of students in transported education systems.

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INTRODUCTION

The concept of bullying comes from the Scandinavian term "mobbing" (Olweus, 2010). Mobbing refers to violence against a weaker victim by a group (Smith et al., 2002). In his first study, Olweus expanded this definition to include attacks carried out by one student against another and encompassing broader social interactions among children(Olweus, 2010). Bullying is a process in which the individual characteristics of students, the relationship between the bullying student and the victim, the presence of peers, teachers or other adults, and the wider social environment determine the nature of the bullying relationship (Atlas & Pepler, 1998; Swearer & Doll, 2001). Considering that bullying is a variable, socio-ecological process, it may not be healthy to categorize students as bullies or victims (Crawford, 2002; Elinoff et al.,2004). To understand the social nature of bullying, Swearer et al. (2010) defined the process of involvement in bullying as a process in which students may bully others, be victims of bullying, be the both, be a bystander or an observer, or stay completely out of the bullying behaviour.

Bullying behaviors are a common social problem in all cultures, in different work or school environments, and among all genders and age groups. According to Olweus (2003), bullying is "a type of aggression perpetrated by an individual or a group against a defenseless person,which has physical or psychological consequences and shows continuity." As students attending primary schools, which is the first stage of compulsory education, move away from their immediate environment and enter unsupervised environments where adults are present, the likelihood of encountering bullying behaviors increases. This research focuses on the experiences of students who attend multigrade primary schools in the area where they live or in TPS that are far from the environment they live in, regarding bullying behaviors.

Problem Statement

While pre-school education is optional in Turkey, four-year primary school, four-year secondary school, and four-year high school are within the scope of twelve-year compulsory education. In general, the practice of multigrade classrooms (MGC) is defined as a teaching method in which more than one class is combined in the same classroom, and the lessons are carried out by one teacher (Erdem, 2008; Sahin, 2003). The concepts of "primary school" and "secondary school" were abolished with Law No. 4306 enacted in 1997 and replaced with "primary school," which refers to an uninterrupted eight-year school. Since it was not possible to convert MGC primary schools into primary schools, these schools were closed, and students were transported to primary schools daily using the transportation means provided by the state in the 1997-1998 academic year. This practice is called "Transported Primary Education Application."

In transported education practice, students who move to a different central school from the villages or towns they live in may encounter problems from the moment they leave their homes. Yeşilyurt et al. (2007) state that students may have to stand while commuting because the villagers use transportation services and that weather conditions disrupt transported education. Ağırkaya (2010) stated that transportation service drivers mistreat students in transportation education practices. In his study examining transported education in the context of social problems, Taşbaşı (2011) stated that transportation service drivers sometimes behave rudely to students.

The aim of the study is to describe and make sense of the frequency of peer bullying; the experiences, feelings and thoughts of students who attend primary schools that practice MGC in their immediate environment, and those who move to primary schools that practice independent classes which are quite far from their immediate environment. It is stated that the attitudes of children who experience peer bullying towards school also change, that children have negative feelings towards school and do not want to attend classes (Hamurcu, 2020).

In MGC, peer bullying is an anticipated problem when students of different ages and levels are in the same environment. There is no study in the literature on comparing peer bullying in primary schools with MGC and transported primary schools.

Peer bullying is one problem they may experience. Students may experience bullying verbally, physically, or emotionally. In the study conducted by Arı et al. (2004), it was concluded that students who attend boarding schools or primary schools with transportation have higher levels of homesickness, low motivation, and reluctance than their peers studying in regular schools. Since bullying is a social phenomenon and social interactions between students vary according to age and gender, these variables are important in terms of examining different forms of bullying (Underwood and Rosen, 2011). Bullying, which is examined according to different variables, is examined in this study according to the type of school. In MGC; students of different ages and levels have the opportunity to socialize and they constantly cooperate. They are provided with a warm family atmosphere (Yılmaz, 2014). Another positive aspect of MGC is that students of different ages and levels are together and benefit from peer learning. Interaction and cooperation opportunities are also among the positive aspects of MGC (Güler, 2016). Although MGC is considered as a practice resulting from necessity in Turkey, studies show that the practice is in the best interest of students in various aspects and has strong pedagogical outcomes. Şentürk and Işık's (2003) research reveals that citizens living in villages want their children to study in villages they live in, and that they hold the view that transported education is not a good alternative for their children. A sense of belonging and security must be ensured for both teachers and students for education and training to be carried out effectively.

Research Questions

Answers were sought to the following two questions regarding the purpose and importance of the research:

1. What are the experiences, feelings, and thoughts of students attending MGC primary schools and bussed primary schools about peer bullying?

2. What features in the structure and functioning of both primary school types prepare the ground for or prevent peer bullying?

METHOD

This research is basic qualitative research since it aims to reveal the experiences, feelings, and opinions of students attending primary schools that employ MGC and TPS regarding the phenomenon of peer bullying and to evaluate the resulting situations together with the structure and characteristics of primary schools.In this research, the basic qualitative research method was used. Basic qualitative research aims to investigate how people understand their lives and experiences (Merriam 2013). In this study, peer bullying was described from the participant's tone of voice, their shyness or self-confidence, the color of their face during the interview, their gestures and facial expressions, the sociocultural structure of their geography, and the researcher's observations.

Participants of the research

The research sample consisted of students studying in multigrade classes and TPS in Tokat province. Students were determined in accordance with the principle of maximum diversity sampling. The study's participants consisted of 19 students from three village primary schools operating as MGC and 12 students from three transported primary schools, one in the city center, one in the town, and one in the village. Participants will be included in the study with codes instead of their names. Multigrade class female students will be listed as MF1, MF2… (multigrade class female), male students will be listed as MM1, MM2… (multigrade class male). Transported female students will be listed as TF1, TF2… (transported female) and transported males will be listed as TM1, TM2…

(transported male). Participants are 3rd and 4th grade students in both school types and they are between the ages of 8 and 10. Students' grades, ages, genders, distances between home and school, and living in villages or centers were evaluated as indicators of maximum diversity. The aim of this study to obtain data from a sample with maximum diversity was evaluated as a feature that will support the transferability of the study.

Collection of data

The students were given the necessary information about which behaviors constituted bullying and were asked a semi-structured interview form consisting of open-ended questions about their status as bullies and victims.

The questions in the prepared interview form were submitted to expert opinion to ensure their validity. Alternative question and probe suggestions from experts in educational sciences and experts who have researched on qualitative research techniques were taken into consideration. No changes were made to the main lines of the interview form. The interview form was finalized by taking into account the opinions of experts. In order to collect the data, the measurement tool that was finalized after the expert opinions were presented to the Hacettepe University Ethics Commission, and it was deemed ethically appropriate with the Rectorate letter dated 26 June 2018 and numbered 35853172-300-E.00000104713. Afterward, it was submitted to the Tokat Provincial Directorate of National Education, the schools to be included in the application were determined, and research permission was obtained. Before the interview, students were visited at their schools. Since their volunteering would be the basis, they were informed about the type of study in the preliminary interview, and they were told that their names would definitely not be revealed and that their evaluation would not be shared with others. During the interview, consent from the interviewees were obtain to record the interview. Before the application, the necessary permissions were obtained from the parents and the interview was conducted with the parents' knowledge of the day and time of the interview. Since necessary permissions were taken, recording was made and notes were taken. It is thought that supporting the research questions with alternative questions and probes will increase the reliability of the research. Each interview lasted approximately 30 minutes.

Data analysis

Following the research questions, categories and classifications (such as types of aggression) in the relevant literature and theoretical framework were used to create codes (descriptive analysis). In addition, the participants' statements and interpretations of these statements (interpretive analysis) were also included. In the emotional bullying category, the codes "humiliation," "exclusion," "marginalization," and "grouping" were created in the expressions of "not being included in the game / being kicked out of the game." Such codes were used when organizing the raw data. These codes were interpreted with participant statements to answer the research questions. To support the interpretations, prominent participant statements were included in a "narrative" style.

Table1. Bullying experiences and Reactions

Category	Codes	Participant View
Verbal Bullying	Swearing Teasing	"My classmates swear. But most people swear in our village." (MM3)
Physical Bullying	Harming objects Pulling hair	"My friend is always pulling my hait but I keep quite because I don't want to offend them." (MF6)
Emotional Bullying	Exclusion Gossiping	"They exclude me in games. They always talk behind me." (MF7)
Reactions to bullying	Complaining to the teacher Complaining to the family Solving the problem on their own Remain as a bystander	"First I tell it to my teacher." (MF1, MF2, MF3, MF6, MM5, MF7)

FINDINGS AND COMMENTS

This section presents the findings related to the question, "What are the experiences, feelings, and thoughts of students attending primary schools with MGC and students attending TPS regarding peer bullying?". Then, the findings related to the question, "Which features in the structure and functioning of both types of primary schools motivate peer bullying or prevent peer bullying?" are presented. The names used in the presentation of the findings are not real names but rather pseudonyms constructed by the researcher according to their gender.

Findings regarding the first research question

Experiences and Opinions of MGC Students on Peer Bullying

The students were asked questions to reflect on their experiences and feelings about verbal, physical, cyber and emotional bullying. The meaning of bullying and the situations of being exposed to bullying were explained with examples, and awareness was created among the participants. MM5, a 3rd-grade student, said: "I heard the word bullying on television. In our class, no one yells at me, no one misbehaves. First graders are a bit naughty, but they get wiser as they grow up. We are like siblings. Our teacher and we will teach them the rules." One of the most common answers in the interviews was, "We are like sibllings," just like MM5, a 3rd-grade student, said.

As for verbal bullying, abusive language is among the frequently repeated behaviors. MF1, MF3, MF4, MF5, MM4 started that there was abusive speech. As another student, MM3, stated, "Our village already uses abusive language." This can be considered a situation arising from the sociocultural structure in the village. " My classmate swear a lot but everyone in our village does. So, it is okay." In expressing his thoughts, it is revealed that the family and social environment affect how they speak. According to social learning theory, observation underlies the learning of behavior. The individual observes, learns, and then applies the behavior. It can be said that abusive speech is a behavior learned from the social environment.

3rd-grade student MF1; "The boys in our class swear a lot. They tease girls. I tell my mom, and she laughs. But it's not funny!". Similarly, MM4 said, "Ahmet swears a lot. He goes to the principal's office all the time, but he doesn't change. Transported students come to our class; we don't want those from that village", emphasizing the presence of transported students. Some students come to the multigrade classroom with transportation, and MM4, a 3rd-grade student, states that students from that particular village disrupt the order of the classroom. Since they come from another village, he switches from "I" to "we" and says, "We don't want them." Ahmet could not be interviewed because parental permission could not be obtained. Of the 19 MGC students interviewed, 14 stated that there was no verbal bullying. MF9, a 4th grade student, said, "There is Ali in the second grade. He is very naughty and always interrupts and spoils our games. I guess because he is young. So we don't say anything. He's like our brother." She states that although problems in the classroom environment exist, these are temporary. Some of the responses of the in MGC who stated that they did not experience verbal bullying and that everything was fine in the classroom are as follows: "No one did it to me, and I wouldn't do it either." MM6, 3rd grade; "Everything is fine, we have no problems with our friends." MM8, 4th grade; "I have never had any problems with my friends, I don't think I will ever have any." MM9 3rd Grade; "No one yells at me in my class." MF2, 3rd grade.

Two of the three village primary schools that implement MGC are children of their village, and no findings of verbal bullying were identified in these two schools. However, there was finding of swearing at the school where students were transported to the school where MGC were implemented. However, abusive speech was not made deliberately and continuously to the same defenseless person. The findings must be evaluated and investigated socioculturally, such as the local accent. It cannot be considered bullying.

Physical bullying behaviors can be described as hitting, pushing, pulling hair, or damaging objects. According to the content analysis findings of the interviews conducted in schools with unified classrooms, it is more common than verbal bullying. The bullying behavior of damaging objects was mentioned by three of the participants. The bullying behaviors are in the lower grades in terms of age. "Ali is in the second grade, and he always damages my books. He tears and scribbles." MM2, 4th grade.

MF6 cannot tell her teacher about her friend because they have been friends for many years. In addition to physical violence, she also suppresses herself emotionally. "I cannot tell you his name, but I have a friend since kindergarten. He is always pulling my hair. I protect myself sometimes and don't tell anyone so my friend doesn't get offended and sulk." Inci, 3rd grade. Participants MF2, MF3, MF4, MM1, MF5, MM5, MF7, MF10, MM8, MM9 stated that they have never bullied others or been subjected to physical bullying themselves by answering "Never happened/no/nothing happened in class."

The participants were asked the question, "Have you been bullied by schoolmates through social media or mobile phones, or have you engaged in such behaviors?" The participants responded that they did not use social media or cell phones. It should also be noted that the participants, being primary school students, have yet to experience using social media due to their young age and living in a village environment.

In the study, when two of the 19 students attending schools with MGC were asked for their opinions about their experiences of being exposed to emotional bullying or bullying, they answered: "I don't want those who come from other villages with transportation. I wish they wouldn't come. They are always disagreeable. They gossip and drive a wedge between us and our friends. The school is very good when they don't show up." MF6, Grade 3: "They exclude me in games. They don't like me. They talk behind me and gossip about me." MF7, Grade 3.

MF6 and MF7, students in schools practicing MGC, stated that they were exposed to emotional bullying. The other 17 students said "No." as the answer. Gossip is a common point in both responses as emotional bullying. Another common point is that gender and class levels are the same. Inci stated that the students who come with transportation create disharmony in the school environment.

Participants in schools with MGC were asked the question: "When you are subjected to bullying, do you share it with anyone?". 3rd-grade students MF1, MF2, MF3, MF6, MM5, MF7 answered: "First I tell my teacher; then I tell my mother and father." 4th Grade students MF4, MF10, MM9 answered: "I only tell my mother." 4th-grade students MF5, MM2, MM3, MF8, MF9 and 3rd-grade student MM6 answered: "I only tell my teacher. What happens at school stays at school." 3rd-grade students MM9 and MM4, 4th-grade student MM1 answered: "I don't tell anyone. I solve it if I can do it myself." 3rd grade student MM7 said: "I only tell my friend". While 12 of the 19 MGC students interviewed found it appropriate to tell the teacher, three participant students did not tell anyone and tried to solve it themselves.

The participants were asked, "How do you act when you have friends exposed to these types of bullying?". 3rd-grade students MF1, MF2, MF3 and 4th-grade students MF4, MM1, MF9, MF10 answered: "I don't know. I don't do anything. I just watch." The students who responded, "I remain as a spectator without reacting to bullying" are the students who have not been exposed to bullying in the classroom environment when the interview is considered. "I tell my teacher and wait for them to find a solution. The teacher will get angry with them." Eight students who answered, "I tell my teacher and wait for them to find a solution." view the teacher as the source of intervention and solution. 3rd grade student MF6 said, "I don't just watch. I immediately protect my friends by asking why they are doing it. Those who come with transportation disrupt our order. They fight among themselves. If the bully is right, I don't touch them, and I don't interfere. But if they are from our village, I intervene." A similar statement was made by MM9, a 3rd grade student, and MM8, a 4th grade student, who said, "I protect

my friends and try to find a middle ground." MF6, one of the students who would intervene herself without being a bystander when she witnesses bullying, stated that she would be a bystander if the bullied student was one of her friends who came with the transportation education practice.

Experiences and opinions of students attending TPS regarding peer bullying

In this section, the experiences, feelings, and thoughts of students attending TPS regarding peer bullying are given. The experiences of students who are transported to an independent primary school located far away from their immediate surroundings are presented together with the participants' views in terms of being exposed to peer bullying or being bullied.

When the participants' views on verbal bullying were analyzed, four of the 12 students attending a primary school with transportation stated that they had never been verbally bullied. 3rd-grade student TF2 stated: "They always call us losers. They don't like us because we come from the village." while TF3, also a 3rd-grade student, said, "I have a friend who lives here in the city, he always calls me naive. He throws me out of the game and yells at me. In fact, he always yells not only at me but also at girls from our village." It is evident that there is discrimination between urban and rural students in the school environment. Students are verbally aggressive on a continuous basis. TF5, one of the 4th-grade students who was exposed to verbal bullying, said: "They insult me. A boy named Osman says 'your very existence is filth' to people from our village. He says, 'You are peasants, you are dirty, you stink, the classroom stinks because of you'", indicating that there is a deep segregation.

In transported education practice, students who move from their villages or towns to a different central school may encounter problems from the moment they leave their homes. The students' evaluations of the bus driver may also be considered as being exposed to bullying behaviors. TF6, a 4th-grade student, said, "Our bus driver yells a lot; he uses profane language. He gets very angry if we are late. But we can't say anything when he is late, of course."

Similarly, 4th-grade student TM6 said, "Our bus driver yells and swears a lot. He does not make a sound when he is late, but if we are late, we are scolded and sworn at. We can't do anything to him, but if someone swears in class, I first beat them and then we go to the principal." Here, TM6 projects the behavior he learned and coded to his peers. As mentioned in the literature, the transportation process is also a very problematic one. There are many service problems ranging from the lack of training of the bus drivers, mistreatment of the students, and the use of the bus by the village people. TF6 expresses her discomfort with the bus driver, while TM6 reflects on the bullying he is exposed to on the bus by his peers at school. He applies the verbal bullying he suffered in the bus service to his peers as verbal and physical bullying in the school environment.

When we examined the opinions of 12 participant students attending primary schools with transportation about physical bullying, 3 students stated that they were bullied, while one student (TM6) emphasized that he was the bully. They stated that physical bullying occurred during lunch. TF4, a 4th-grade student, said, "There is a lot of pushing during lunch. At every meal, the same people push and shove their way to the front." Students attending transportation education expressed difficulties such as the eating environment, the cleanliness and temperature of the environment, and brawls during meals.

Within the scope of the research, it was aimed to evaluate the experiences and feelings of the participants related to cyberbullying regarding the use of cell phones, access, and use of social media. However, all 12 students attending primary schools with transportation do not use cell phones and social media. It should also be noted that although the participant students are young and attend a center with transportation, they do not yet have experience in using social media because they are primary school students.

After the students attending primary schools with transportation were informed about emotional bullying, it was examined whether they were exposed to this type of bullying. TF3, a 3rd-

grade student, said, "Derya always calls me 'naive'. She kicks me out of the game. She has a clique; they all treat me the same way. I want to stay in my village. Our village has a school like this, but it is closed. I am very unhappy here." TF3 sees herself as weaker than her friends because she comes from the village. The fact that she wants to play games but is not allowed and is thrown out of the game makes feel alienated. If she attended school in her village, she would feel that she belonged to the environment and would not feel marginalized. TM4, a 4th grade student, stated that he had the same problem and was not included in the games. TF5, a 4th-grade student, was not included in the games for a similar reason and stated that she was offended: "They say that we stink because we come from the village, and they don't let us play. They are disgusted because we smell like a barn. I am always excluded from the games." Expressing that the teacher is also aware of this discrimination, TM6 said, "They always exclude us who come from the village. They discriminate. Actually, i think the teacher is also aware of it. They don't let us in the games, so I play with people from my village." There is a school environment where the distinction between urbanites and villagers is felt, and the language of "we" is used instead of "I" based on discrimination and social class.

The question "Do you share with anyone when you are bullied?" was posed to 12 students attending primary schools with transportation. Eight participants answered: "First, I share it with my teacher, then with my mother." It is shared with the teacher first to find a solution, and when they return home, the family is informed. Sharing with the teacher and family is very important to cope with bullying. On the contrary, 3rd grade student TM3 said, "I don't share it with anyone. What happens at school stays at school." She states that she does not share her bullying with anyone. TM3 states that she was bullied during lunch in the schoolyard but did not share it with the teacher or her family. Similarly, TF4, a 4th-grade student, said, "I tell the teacher, but I don't tell my mom because she might get upset. We are not in our village; it will preoccupy her. She can't come here since it is quite far from our village." TF4 is a student who stated that she was subjected to bullying during meals and shared the situation with her teacher. She stated that her teacher could not prevent the bullying and that the same student continued bullying at every meal. Since she is far away from her village, she thinks that her family will be disturbed by the situation and that they will not be able to come because it is far away, so she hides it from her family. TF3, a 3rd-grade student, and TM6, a 4th-grade student, stated that they would overcome bullying behaviors on their own by saying, "I solve it myself; I don't tell anyone."

Twelve students attending primary schools with transportation were asked, "How do you behave when your friends are exposed to this kind of bullying?". Seven participants said, upon witnessing the bullying, "I told my teacher and they punished them." The students, who said that they warned their friends but also informed the teacher, stated that they would tell the teacher about every bullying behavior they encountered, but that it was not a complete solution. TF1, a 3rd-grade student, said, "Our teacher punishes them by not allowing them to go out for recess, and the next recess, they continue the same behavior in the classroom or the schoolyard. So, it is not a solution. I wonder if the teacher should make the punishment more severe?" and emphasized that bullying did not disappear and continued at the same level. TF3, a 3rd-grade student, and TM6, a 4th-grade student, responded as follows: "I intervened, and I will intervene again."

During the interview, the participants were asked, "Do you have anything you want to tell other than what we discussed?". The answers received were about the negative reflections of the transportation education practice. MF6, one of the students in schools that practice MGC, said: "I don't like those who come to our school with transportation. The children of that village are not like the ones in our village. They are always fighting. They disrupted our order." MF7 had similar thoughts: "I don't like those who come with transportation. They will corrupt the children of our village as well." Children who are transported from their villages to another village are viewed as a threat to classroom order.

MM9, a MGC student, also had some concerns: "Next year, our school will be closed, and we will go to Tokat province. I don't want it at all. Those who go to Tokat go to school when it is dark.

Here, I leave home ten minutes before class and make it to my class. My sister goes to school in the city, and she doesn't like it at all. She leaves almost two hours before me."

TF1, a 3rd-grade student who attends transported primary school, said: "We are standing on the bus. People from the village get on the bus. They sit because they are the elders. When I stand, I feel very nauseous in the morning. The school in my village is closed, and I never attended there. If my school were in my village, I would eat my mother's proper meals at lunch. The food queue is very troublesome. I don't like coming here, I wish I could walk to my school." She wants to go to her village school, which remains unused. She states that she encounters problems from the moment she leaves her home and has problems regarding service and food.

Eleven of the 12 students attending primary schools with transportation stated they had something to add. They emphasized that they did not want to attend school with transportation. TF2 said, "I would like to go to school in my village." TM1 said, "I wish my school were in my village. But here, there is a grocery store close to this school. Actually, that's why I like this school. It's good that there is only one grocery store; otherwise, if it were in my village, we would be comfortable at lunch. We could go to the toilet at home. Still, school is not comfortable. Commuting is also tiring, and it takes us half an hour." They emphasized the importance of eating lunch at home and being able to go to the toilet easily. TF3, a 3rd-grade student, started school in her village, but when the school was closed, she had to go to a primary school with transportation farther away from her home. She said: "I went to first grade in the village. The teacher would come occasionally. And the teachers changed all the time. In the end, no teacher came at all. The school in the village was far from home, and it was difficult to walk to school. Now we walk to the mosque and take the bus. The walk is short, but the school is far. I wish a full-time teacher had come and we could have stayed in the village. Our school is very nice. If a teacher said they would come, the whole village would make the school even better. The chief of the village gives tasks to the fathers, and they do them. It is very cold where we eat here. The walking distance to the school in her village is longer than the distance she walks to get on the bus, but she stated that she would be more comfortable if the school in her village opened and she could attend there. TM3, a 3rd-grade student, said: "I wish they took this school and put it in our village. And I wish the teacher always came. The school in our village would look like this school if it was painted and computers were put in. Also, commuting makes me tired. The villagers from our village who go to Tokat province always take our seats before we get on the bus. I would love to be in my own village."

Participants who talk about teachers not coming regularly think that the school in their village will be opened with teachers coming regularly. Most students who said that the closed schools in the villages remained idle mentioned the advantages of going to school in their villages. TF4, a 4th grade student, said, "I would like to study in the village. I already have a school in my village. Actually, we went to another school first, but I guess complaints were made to our mothers about it. Then they assigned us to this school. I also went to school in the village, but the teacher did not always come. I wish my teacher here would come to the village. I would go home for lunch. We can come here in 20 minutes with the shuttle service, which is not long." Similarly, TM6 said, "I wish I were in my own village. It was very good when I was studying there. In the village, I would go home for lunch; here we go hungry." Similar problems were repeated by many participants. TM5, a 3rd-grade student who was transported because the class capacity in the school in his village exceeded the existing capacity, said, "I couldn't go because there was no room in the school in our village. The school in our village is better. I wanted to go there but couldn't, I have friends who go there and we come here in vain. I wish they had built another classroom." Not being able to participate in after-school activities or sports evokes feelings of isolation. A 4th-grade student, TM4, said, "I would love to have my school in the village. I have many friends there. The school was open for a while, but the teachers did not come regularly, so they sent us here. Those of us who come with the school bus cannot participate in anything after school. We rush to the bus." TF5, a 4th grader, is a student who experiences almost all the problems mentioned above.

Bullying, problems in the bus service, adverse physical conditions of the cafeteria, and disruptions in transportation from the village to school; TF5 pointed out a common problem: "My sister is in the first grade, and they make fun of her because she has short hair and they call her a 'peasant boy.' I wish we were in our village; no one would call us dirty villagers. I am not dirty at all. When we get on the bus, there is no room for us. I sit and take my sister on my lap, and sometimes we both stand. Our villagers come to Tokat by bus when we go to school. The dining hall is outside here. Our village is a plateau, the snow blocks our road a lot, and when it snows, the bus can't go up, and we can't come to school that day." A study conducted by Arı et al. (2004) concluded that students attending primary schools with boarding or transportation had higher homesickness, low motivation, and reluctance than their peers studying in regular schools.

Findings related to the second research question

School structure and teacher attitudes also cause or prevent peer bullying. Firstly, the structure and characteristics of the school with unified classrooms, and then the structure and characteristics of primary schools with transportation were included.

Considering the experiences of students in primary schools with MGC, peer bullying is almost non-existent. There is a family environment at school. The participants were 3rd and 4th graders, and the bullies were 1st and 2nd graders. However, those who were subjected to bullying stated that they were young and would not do it when they grew up. The perception was that the younger siblings of the family were misbehaving. The teacher acted as the solution center. Students said they would share with the teacher if exposed to peer bullying. The teacher was in the role of parent, creating a classroom culture with students as older brothers, older sisters, and younger siblings. Students exposed to peer bullying stated that students who came to school with transportation disrupted the classroom order and that the classroom environment was better without them. Although the age groups were heterogeneous, the older students did not bully the younger students but had a protective and caring attitude. The concern of the students in MGC is that they do not want to go to another school with transportation.

Students attending TPS experiences difficulties such as getting up too early, being exposed to bullying by the driver. They stated that the school they attend with transportation is not physically very different from the schools in their villages. Students exposed to many forms of bullying, such as discrimination, groupings, and being excluded from games, do not feel comfortable in the school environment. Students who came to school early reported that they were hungry until and during lunchtime. Some students expressed problems such as pushing and shoving during meals and feeling cold in the eating environment. There are questions about whether transport schools are physically adequate for the students. The students emphasized the importance of eating hot meals in a warm environment at home. They stated that the dining halls are outside the school and, therefore, cold. Students think that being at home during lunch breaks for toilet needs will make them feel comfortable. It is obvious that physiological needs cannot be fully met in schools. Students attending primary school with transportation wanted to go to school in their villages and stated that they were not satisfied with the school environment they were in.

The students who felt they could not participate in national holiday activities at school and were excluded emphasized that all their friends who came with transportation faced the same problem. Students who come to primary school with transportation have to leave their friends behind after school and this limits their friendship relations only with their friends from their villages. They do not have a sense of belonging. Students who live in the city or town exclude the students who come with transportation and engage in verbal, physical, or emotional bullying behaviors. Even if the students who come to the primary school with transportation share the bullying behavior they are exposed to with their teachers, they believe there is no solution. These students stated that they were exposed to bullying behaviors such as humiliation, insult, and exclusion from games by their peers in the school environment, where they felt alienated, and were hesitant about sharing these behaviors with their

families. According to the students who come with transportation, their families are far away from them, and they will feel sorry for their situation but cannot find a solution.

While an educational environment of tolerance, love, and respect with a family environment was created in the schools with MGC, the situation in the primary schools with transportation is the opposite. While the bullying of students attending TPS starts on the way to school and continues until they return from school, the behaviors that are difficult to define as bullying in the school with unified classrooms are tried to be solved by the students themselves.

To compare the reactions of students to bullying behaviors in the two types of elementary schools, participants were given sample situations related to bullying types and asked how they would react. Students' reactions to verbal, physical, cyber, and emotional bullying behaviors were evaluated. Firstly, the participants were asked: "While you are washing your hands, another child comes and pushes you and puts his/her hands under the faucet. How would you react?" Of the 19 students attending a primary school with MGC, eight said, "I warn, I get angry, I tell them to wait for their turn. If they don't move, I will have to wait. Then I tell my teacher." The other 11 students said, "I get angry, tell them to wait their turn, and I push them. I do the same thing then I tell my teacher." Three of the 12 students attending TPS said, "I get angry, I don't let them go, so I push them." In contrast, nine of them said, "I go to the other faucet, and I don't say anything." According to the study, primary school students exposed to bullying, discrimination, and exclusion were hesitant to respond with tit for tat. Students attending primary schools with MGC, on the other hand, react with the thought that their rights are being taken away because they do not experience bullying. Afterward, they prefer to tell the teacher to find a solution. The theory of moral development based on Piaget and Kohlberg's Four-Component Model comprehensively evaluates students' reactions to sample situations. In this model, the individual's reactions to an event and their decision-making on their behaviors are evaluated.

For example, "A friend from your class scribbled in your notebook and wrote a bad word, and you see that they are laughing and looking at you. How would you react?" Fourteen of the 19 students attending primary schools with MGC responded: "I would get angry, warn them, and tell my teacher so that he/she can punish them." The other five participants responded, "I would go and scribble in their notebooks or books during recess so that we would get even." Eleven of the 12 students attending primary schools with transportation said, "I tell my teacher. I don't do anything else." TF1, a 3rd-grade student, said, "I would scribble in their notebook too." As in the first example, students exposed to bullying behavior do not find it fitting to bully. Participants gave shy answers in a low voice during the interview. Participants who experience bullying react by empathizing and distancing themselves from bullying behaviors because they know how much it affects the victim.

Ignoring, one of the emotional bullying behaviors, was evaluated with the question: "When you come to school you say good morning to your friend, and he ignores you. The same friend continues this situation for days. How would you react?" Six of the 19 students attending primary schools with MGC said, "I would do nothing, I would walk away." Thirteen participants said, "I would talk and try to understand why. I ask my friends. We don't get cross normally." Six of the 12 students attending primary schools with transportation said, "If they sulk, let them sulk. I will not greet him/her again." The rest stated they would be curious about the problem by saying, "I would talk to him and try to figure out why." Students attending primary schools with MGC stated that such a situation would not occur between them and would try to understand the reason even if such a situation occurred. However, students attending primary schools with transportation stated that they would accept the situation at a higher rate and continue their lives. Students attending TPS who are exposed to emotional bullying normalize ignoring and exclusion at a higher rate.

To determine the reactions of the students when steered toward bullying behavior, the following question was asked: "A popular person at school wants you to pull the hair of a girl he always teases. You need to do this to be in the popular group. How would you behave?" Except for one participant, students from both school types answered, "I wouldn't do it. It is unfair." TF6, a 4th-grade student attending a primary school with transportation, said, "I would do it. But while pulling

her hair, I say in her ear that I am just joking." TF6 stated that she was not subjected to emotional or physical bullying. However, she was subjected to verbal bullying by the bus driver.

RESULTS AND DISCUSSION

When examining the experiences of students attending both types of schools regarding any kind of bullying, we find that though they are third and fourth-grade students, the bullying behaviors they experience are quite common. While a family-like environment is more dominant in MGC schools, this situation is the opposite in TPS. MGC students expressed themselves well, were confident throughout the interview, and accepted their friends and teachers as family members. In contrast, TPS students exhibited more reserved attitudes during the interview. The fact that young children from villages are taken away from their families, travel a distance to school daily, and enter an unfamiliar environment at a very young age results in psychological and academic difficulties compared to students attending schools near their homes. Küpeli (2020) stated that students' feelings of fear and loneliness, seeing themselves as weak, and the idea of belonging to a group can cause peer bullying. Alkaya and Avşar (2018) state that the individual's inability to adequately convey the communication problems experienced during the socialization process are the reasons for peer bullying. Students in TPS are more vulnerable to peer bullying.

The findings also show that TPS students are more exposed to peer bullying. "Swearing" and "abusive language" were the most common verbal bullying encountered by MGC students. However, the family structure and social environment in villages also use foul language. They mentioned swearing with subjects like "my father," "my grandfather," and "my neighbor," indicating that it cannot be considered bullying as it is not intentional but rather a local dialect and accent. The research shows that first or second-grade students are usually the bullies in multigrade classrooms, and the students who are subjected to bullying approach with tolerance, stating they will not exhibit these behaviors when they grow up. Some students are transported to the primary school where MGC is implemented, and the bullying experiences of MGC students are mainly caused by those who come with transportation. The inclusion of transported students disturbed the existing village children, and the transported students exhibited bullying behaviors, struggling to adapt to the new environment. The study revealed that verbal and physical bullying were the most common types of bullying, with verbal bullying being a little more prominent. There are studies in the literature that have reached similar conclusions (Gökler, 2007; Karatzias et al., 2002; Pişkin, 2010; Polat and Sohbet, 2019; Atış Akyol et al., 2018).

The opposite is true for students who move to a school many kilometers away. Transported students exposed to much peer bullying experience verbal insults and humiliation. They cope with bullying from bus drivers and peers. Moreover, the buses carry villagers to the city, causing problems such as standing up, insults, and abusive language. Many studies on transportation education report similar issues related to bus drivers, supporting the study's findings. The bullying experience causes students to become disillusioned with school and move away from it (Üstündağ Şener, Başar, Şen, & Göncü, 2015). All these negative experiences, especially violence, turn into an individual, social, and even universal problem (Başar & Çetin, 2013).

TPS students are subjected to bullying by peers in the school environment, including the schoolyard, classroom, and cafeteria. They face exclusion, humiliation, and marginalization and often want to attend school in their villages. The physical conditions of the eating environment are among the most significant problems. While some schools lack cafeterias, others have unheated cafeterias. This study revealed that peer bullying, such as pushing, cutting lines, and ignoring, was common in cafeterias. Students wanted to eat at home during lunch breaks, believing it would be more comfortable if they attended school in their villages. In some studies, students stated that violence occurs in school areas such as classrooms, school yards and corridors (Başar and Çetin, 2013; Bentley and Li, 1996; Çınkır and Kepenekçi, 2003; Kartal, 2008; Kartal and Bilgin, 2009; Özgür et al., 2011; Yalçıntaş-Sezgin, 2017). Burnukara and Uçanok (2012) concluded that students encounter bullying both inside and outside of school.

The bullying experiences of MGC students and TPS students are quite different. In TPS, bullying in the service and eating environments, as well as exclusion by friends, caused timid behaviors in children. However, most students in TPS do not tell their families about the bullying. In MGC, there is a tendency to share with family and teachers when exposed to peer bullying. TF4, a 4th-grade student, said, "I tell the teacher, but I don't tell my mother because she would get upset. We are not in our village; it would preoccupy her. She can't come here; it is quite far from our village." When students in TPS are exposed to bullying, they prefer to share it with their teachers. Teachers are the most influential people for these students far from their families. In interviews with TPS students, they expressed feelings of isolation and a lack of solutions to their problems.

The study's findings on virtual peer bullying situations show different approaches between the two school types. TPS students, who experience peer bullying, do not show bullying behaviors in sample situations and share their experiences with teachers, seeking solutions. They empathize and avoid bullying due to their experiences. However, MGC students respond to peer bullying with bullying, although the rate is very low. They see bullying as a rights violation, defend themselves in virtual situations, and seek solutions with the teacher after their warnings. The findings show that MGC students are more exposed to verbal bullying, while TPS students are more exposed to emotional bullying. Research indicates that emotional bullying, such as humiliation, marginalization, exclusion, and not being allowed to play, is more prevalent in primary schools with transportation.

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