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CONTENTS	Pages
Inside cover	**i**
Generics Page	**ii**
Contents	**viii**

Navigating through Turbulent Times: U.S. Secondary Teachers Share Their Experiences as Online Learners during the COVID-19 Pandemic and the Implications for Their Teaching Practice

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Abstract:

This participatory action research was a collaborative endeavor designed to identify the challenges secondary in-service teachers confront as learners in a virtual context and the implications their participation in graduate synchronous remote coursework had for them as middle and secondary classroom teachers teaching online. This article highlights the obstacles schools have been facing amid the coronavirus pandemic, presents the fears consuming teachers, parents, and students, describes the frustration with remote learning, and summarizes the pre- and post-coronavirus teacher stress, burnout, and attrition occurrences. This article also outlines preventative measures to make schools safe and secure, and discuss how supporting teacher self-care, promotes student wellbeing. We share lessons learned from identifying teacher stresses in the online virtual learning context and redesigning our graduate courses for our participants by modeling best practices for coping with technostress, incorporating technology tools, modifying pedagogical procedures, and integrating various resources to enhance virtual instruction. Using thematic analysis, we identified the following themes which impact the e-teaching-learning experience: a) juggling multiple demands in the home environment while learning online is distracting; (b) balancing work-life responsibilities is challenging; (c) teaching and learning in a virtual context is isolating; (d) dealing with technostress is overwhelming, and (e) practicing self-care allows teachers to support student wellbeing. We summarize the findings from this project where the teachers reflect on their personal experiences while enrolled in online graduate courses and describe how the teachers' experiences as learners informed their teaching practice.

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INTRODUCTION

The worldwide spread of the SARS-CoV-2, the virus that causes COVID-19, has affected our lives in dramatic and profound ways. Not only has a healthcare crisis linked with a crippled economy ensued, but it has exacerbated our anxiety and caused us to rethink our relationships, the way we work, how we socialize, our spiritual search for meaning and purpose, as well as other aspects of our wellbeing. The COVID-19 global pandemic has dramatically and irreversibly changed every element of our lives, including how teaching and learning occur. During the spring 2020 semester, schools around the globe closed in response to the pandemic health threat. On March 16th, K-12 and university classes across the United States transitioned to remote online learning (Education Week, 2021).

Amidst the pandemic, teachers around the world united by profession. As dedicated, selfless professionals, many educators would agree that returning to in-person instruction would benefit the academic progress, socio-emotional development, and healthy wellbeing of their students. After all, our schools play a crucial role in supporting the whole child, not just their academic achievement (Centers for Disease Control and Prevention [CDC], 2020). "America's teachers are sending an SOS because we know that if we don't return to face-to-face learning, a generation of students will be added to the coronavirus casualty list," American Federation of Teachers (AFT) President Randi Weingarten predicted (Camera, 2020, para.14).

However, like healthcare frontline and other essential workers, teachers were particularly vulnerable to the threat of transmissibility and pandemic-related emotional distress. Therefore, even though educators have been concerned about the potential dramatic, negative scarring effect on a generation of students whose learning, grades, social interaction, motivation, and stress levels have been altered by remote learning, they remained apprehensive that the re-opening of schools during the 2020-2021 academic year could jeopardize the health and safety of all the stakeholders involved (Couzin-Frankel, et al., 2020).

In this article, we highlight the challenges schools have been confronting amid the coronavirus pandemic, present the fears surrounding the re-opening of schools, describe the frustration with remote learning, and summarize the pre- and post-coronavirus teacher stress, burnout, and attrition realities. We also outline preventative measures taken to make schools safe and secure, and discuss how teachers can support students' wellbeing when they practice self-care. We share concerns voiced by secondary teachers participating in virtual graduate coursework in a professional development grant project and highlight how their experiences as learners impacted their teaching practice with the transition to online instruction.

Literature Review

Fall 2020 and Spring 2021 School Re-Opening, Anything but Typical

To address the financial concerns of a volatile economy and get the country back on track, there has been a lot of pressure to reopen businesses and schools. Back-to-school for the fall 2020 and spring 2021 semesters was shockingly different from previous years and is expected to be different in fall 2021. With the health and safety of educators, students, and parents at the forefront, "The scenes hardly resemble typical school: Preschool children instructed to spend recess playing alone inside a chalk square. Eight-year-olds told not to speak to their friends. Middle schoolers reminded to steer clear of classmates when entering or leaving the building," (Couzin-Frankel, et al., 2020, para. 17).

Many teachers, parents, and students alike have suffered from heightened anxiety due to the pressing remote online learning challenges. Since parents needed to return to work, getting our children safely back to school has been a top priority. Teacher unions continued sounding alarms, sharing that many teachers felt highly uncomfortable about returning to face-to-face classroom instruction and have threatened to or have taken steps to strike, walk out, or retire. They have been concerned that reopening schools without the proper equipment, precautions, regular testing for teachers and students, and safety procedures in place could put everyone at risk.

Teacher Health Concerns

According to a report from the Kaiser Family Foundation (KFF), one in four teachers, approximately 1.5 million individuals, were at increased risk of contracting the coronavirus and suffering from serious illness because of their age or the fact that they suffer from underlying chronic medical conditions (Claxton, et al., 2020; Nania, 2020). Approximately 24% of the K-12 teaching corps in the United States consists of teachers over 55. Since the risk of contraction and hospitalization, and the death toll from COVID-19 increase with age, teachers feared that hastily or haphazardly reopening schools could result in dire consequences (Nania, 2020). Even with the vaccination rollout, because we have not met herd immunity in most communities and children under 12 are not yet eligible to be vaccinated, some teachers question the lifting of the mask mandates and social distancing requirements (Khullar, 2021).

Although many Americans would agree that teachers are the backbone of the education system, they were not classified as essential frontline workers by government officials until the Trump administration labeled them as such on August 18, 2020 (Westwood, 2020; Strauss, 2020). Since teachers were not legally considered essential workers at the start of the pandemic like other essential workers needed to maintain public health and safety, or individuals who work in healthcare, construction, food distribution, etc., teachers could not be ordered back to work in person. When the fall 2020 back-to-school frenzy occurred, as well as the new labeling of teachers as critical infrastructure workers,

some school districts required asymptomatic teachers back into classrooms after they had been exposed to the virus (Strauss, 2020).

During the 2020-2021 academic year, schools planned to implement various protective health measures to cease the transmission of COVID-19. As role models, teachers are expected to practice responsible behavior and take the necessary precautions that students may emulate. Wearing face coverings, rigorously maintaining social distancing in classrooms, constantly washing hands, and sanitizing surfaces have been small acts that helped many people succeed in mitigating contact with and transmission of COVID-19 (CDC, 2020). Contact tracing has also helped curb the spread of the virus by collecting confidential data on people who have been diagnosed with COVID-19 and alerting individuals with whom they have been in contact so they could monitor their health and self-quarantine to avoid 'spider-web transmission'(Claxton, et al., 2020).

COVID-19 Expenditures to Reopen Schools

The impact of the COVID-19 recession has created tremendous uncertainty in education funding and increased demands on existing insufficient resources. The AFT conducted a comprehensive analysis of what was needed to safely reopen schools for the fall 2020 semester and the associated costs. Their calculations were more than four times the previous estimates because they included the projected costs to hire additional staff, provide distance learning training for teachers, offer before and after school childcare, arrange transportation, purchase the necessary personal protective equipment (PPE) and cleaning supplies, as well as offer support services to promote students' social and emotional health (Camera, 2020). The AFT projected that the new cost to reopen schools safely with the necessary coronavirus academic and safety precautions resulted in a new estimated total of $116.5 billion (Camera, 2020).

Dozens of other national education groups, including teacher unions, civil rights groups, and organizations that represent state education officials, along with superintendents and principals, requested an additional $175 billion in federal funding. They asked for this funding not only to help pay for things like cleaning supplies and protective gear but also to prevent an estimated 200,000 to 300,000 teacher layoffs expected as a result of budget cuts and to provide internet access for the millions of children who still lack a connection at home (Camera, 2020).

"Scared for My Life"

This past year teachers have been wrestling with the decision to remain in the teaching profession and return to their classrooms. They have been fearful that returning to their classrooms too soon could put themselves or their students in harm's way. They have been conducting risk analyses and weighing their health and the health of their families against their economic security and professional obligations (Noonoo, 2020). This has been a serious issue which is exemplified by the fact that many teachers wrote wills before returning to their classrooms and others protested holding signs that read, "I can't teach from a coffin",

"RIP Grandma caught COVID helping grandkids with homework," and "Here lies a third-grade student from Green Bay who caught COVID at school," (O'brien & Whitcomb, 2020, para. 3). The back-to-school seasons of the past have not presented educators with similar life-and-death dilemmas (Kennedy, 2020; McKinnon & Aspegren, 2020).

Many teachers may have felt economically compelled to return to teach face-to-face when their schools reopened full-time, even if they did not believe they could do so safely. Two-thirds of educators who responded to *Education Week's* poll in July 2020 supported keeping schools closed so as not to advance unnecessary transmission of the virus (Noonoo, 2020).

Remote Learning Aftermath

In addition to providing critical health services, "Schools are an important part of the infrastructure of communities, as they provide safe, supportive learning environments for students, employ teachers and other staff, and enable parents, guardians, and caregivers to work" (CDC, 2020, para 8). Parents who have been at the helm helping their children navigate their schoolwork at home amid the school closures while juggling their work responsibilities, familial duties, and financial burdens, have been frustrated and exasperated. "There is widespread agreement on most points of the political spectrum that a functioning American economy requires working schools, and that the abrupt, unplanned shift to remote learning was disastrous for many children who desperately need in-person instruction" (Shapiro, 2020, para. 12). Coming off more than a year of ineffective remote online learning, several students have fallen behind, and overburdened teachers are anticipating having to design catch-up lessons, in addition to prepping for fall 2021 coursework. There are also concerns about the ever-widening digital divide, which was heightened during this pandemic demonstrating how access alone does not characterize the alarming research on education technology and omnipresent educational inequities (CDC, 2020; Guthrie, et al., 2020; Zielezinski, 2017).

Fall 2021: Return to Face-to-Face Instruction

How best to address the various aspects of teaching and learning have been on many individuals' minds throughout the pandemic. Because of the mixed federal guidance, state and local officials debated many issues to decide if school closures were doing more harm than good and if reopening was to take place, deciding when and how to do it. Due to decreasing coronavirus cases in several locations across the United States, many schools have decided to abandon the blended model and retry face-to-face instruction exclusively since their communities are experiencing a drop in coronavirus cases (CDC, 2020; Guthrie et al., 2020).

Teacher Attrition and Stress

With no playbook and numerous technological challenges, teachers have been giving so much of themselves to create online communities of learners and keep their students

focused, engaged and motivated, despite the stress and uncertainty they have been feeling since the abrupt transition to virtual learning the spring of 2020. Even though "teachers are attuned to the social-emotional wellbeing of our students and trained to monitor for signs such as trauma, anxiety, bullying, or micro-aggressions," the mental health and wellbeing of teachers are often overlooked (Seton, 2019, p. 77). Nonetheless, "Teachers who remain exposed to trauma-related symptoms among students with no support or training become vulnerable to developing a myriad of adverse consequences themselves, including the experience of vicarious traumatization" (Eyal, et al., 2019, p. 209). Teacher stress is 'prominent and pervasive' and all too often, teachers, while caring for their students, end up emotionally bankrupt, suffering from physical, emotional, and cognitive exhaustion (Devaki, et al., 2019; Eyal, et al., 2019; Stiglbauer & Zuber, 2018).

The reality is, even during the best of times, teaching is a taxing occupation that has been ranked as one of the most stressful career choices (Stiglbauer & Zuber, 2018; Welch Brasfield, et al., 2019). The rate of teacher attrition in K-12 schools is high and some feel is disconcerting. Approximately half of the teaching corps leave the field within the first five years of their teaching careers (Seton, 2019). This high turnover rate has been attributed to chronic stress and low job satisfaction. Consequently, more than 60 percent of teachers described 'always' or 'often' experiencing chronic occupational stress during their teaching assignments in an AFT survey conducted of more than 5,000 teachers (AFT, 2017).

According to the AFT pre-COVID-19 survey, the highlighted findings included this negative consequence, "… schools still struggle to provide educators and, by extension, students with healthy and productive environments" (AFT, 2017, p. i). This situation has become magnified during the current pandemic. Schools are considered safe havens for many students. Since education is a cornerstone of American life and schools play an important role in preparing students academically and supporting their wellbeing, school closings may have caused vulnerable students to be at even greater risk than before (CDC, 2020). Students that are in neglectful or abusive homes may have their maltreatment go undetected. Others in need of supplemental nutrition may have ended up hungry, malnourished, or food insecure because they could not take advantage of in-school meal programs. Some students without the necessary technology tools or a household with limited internet connectivity may not have participated in online remote classes. Even if they did have Wi-Fi access, these students may have been unmotivated or disengaged and never logged on; others did not check in regularly. Students with overstressed parents who were unavailable, unwilling, or unable to support homeschooling activities have fallen behind. Additionally, many children and adolescents who relied on counseling services or disability supports have not received the skill development and nurturance they needed (CDC, 2020). There is no doubt that some students have fallen through the cracks.

Back-to-School 2021: Redefining Teachers' Roles

After the 2020-2021 academic year hiatus, getting back into school mode has proven challenging for many students and teachers alike. During the fall 2021 semester, many teachers, students, staff, and parents have already expressed a multitude of ongoing concerns surrounding their respective school districts' ability to guarantee their safety and security, and they have worried that remote online learning has made it difficult for students to catch up, stay on track or leap ahead. Unfortunately, heading back to school this fall continues to be cloaked in limited predictability as teachers have been expected to revamp their curricula once again to address the results from a variety of delivery modes in addition to managing the common obstacles they deal with, including unrealistic demands, student misbehavior, poor working conditions, role ambiguity, limited resources, inadequate professional development, disgruntled parents, among other things (Guthrie, et al., 2020).

There is no doubt that the COVID-19 global pandemic is reshaping how we think about education. Although many K-12 students have struggled with the transition to remote learning, and their parents and teachers have been concerned about the COVID Slide, i.e., academic erosion or learning loss, since students have not been participating in face-to-face instruction, some students have enjoyed remote online learning, and others have even thrived in the virtual context (Kuhfeld & Tarasawa, 2020). Even though many schools were unable to find a perfect model for remote learning, several teachers and schools handled the transition successfully. Their students have enjoyed learning in their own spaces at their own pace. They appreciate the omission of everyday distractions, the flexibility in their schedules, the ability to pursue their interests, and the opportunities to communicate with others in distant locales. Students who have excelled in the virtual environment even report taking their education more seriously and claim they are more productive learning from home. Teachers are sharing, "… that a handful of their students—shy kids, hyperactive kids, highly creative kids—are suddenly doing better with remote learning than they were doing in the physical classroom" (Fleming, 2020, para 3).

Purpose of the research

The TELLS Grant Project

In 2016 the Multicultural Center at a land grant institution in the western United States was awarded an Office of English Language Acquisition (OELA) grant to recruit and educate 60-90 middle and high school teachers from schools across the state with significant proportions of American Indian and other English Language Learners (ELLs), in hopes of raising the academic achievement of these students. Consequently, the Teachers of English Language Learners (TELLs) grant project was conceived to provide ongoing, job-embedded professional development and mentoring to the participants in each of two programs. One program included professional development coursework designed for in-service teachers, which consisted of 12 credits of graduate study towards a Culturally and Linguistically

Diverse Education (CLDE) certificate offered over two summers with one-on-one coaching during the academic year.

During the summer of 2020, 34 secondary teachers in our third cohort were scheduled to come to Boxville to finish the last two courses in their certificate program. Because the pandemic inhibited us from inviting them to campus to complete their program, we spent time discussing and designing synchronous online course sessions that were innovative, interactive, and engaging. It was our desire to mitigate the stress our teachers were experiencing since the spring 2020 transition to online instruction and model pedagogical strategies so they could, in turn, take their experiences as learners in a virtual context and modify their online teaching practices to reach and support their secondary students during the 2020-2021 academic year.

Once it became evident that in-person instruction was out of the question, we created an instructional team and planned for the last two summer school CLDE graduate courses. We already had the instructors lined up to teach the courses, but we had to make several changes to transition to the online learning model. We needed to reschedule the meeting times, review our D2L/Brightspace and Zoom platform suite of products and services, reflect on distance education best practices, redesign course activities, rethink assignments, retrain instructors, revise the learner expectations, in addition to purchasing new equipment, researching connectivity options, practicing delivery techniques, and hiring support staff to guarantee a smooth transition to online instruction. We combined our educational experiences and expertise to integrate technology tools to enhance our innovative virtual teacher professional development coursework. Having had our teachers share how stressed they had been since the abrupt spring 2020 transition to remote teaching took place, we felt compelled to redesign and model best online instructional practices while practicing self-care. We did this so we could be there for our students (the teachers) so they could, in turn, pay it forward and apply the instructional strategies we used with them with their students in the future.

The secondary teachers participating in this professional development grant project were able to be in their students' shoes as online learners and reflect upon how the challenges of engaging in virtual coursework from home and focusing on remote online course demands impacted their experiences as both learners and teachers. Since the participants in this grant project were members of an established cohort who knew each other through intensive face-to-face courses during the previous summer and work with their Instructional Coaches during the academic year, we already had the lines of communication in place. Once the transition to online teaching and learning occurred in March 2020, it became apparent through conversations with the participants, that modeling best practices to keep students engaged was of utmost importance. This pre-established relatationship facilitated the design of this collaborative research project.

METHOD

Research Model

We engaged in Participatory Action Research (PAR) to examine our virtual educative processes as a problem-based investigation. The philosophy and methodology of action research are found throughout the social sciences. MIT professor Kurt Lewin coined the term action research back in the 1940s, and shortly after that, Columbia University teacher-educator Stephen Corey was one of the first to use this unique approach where educators were actively involved in both the research as well as in the application of the findings (McFarland & Stansell, 1993). Over the past eight decades, the interactive inquiry process, which defines action research, has resulted in various methods. Today, Paulo Freire's Participatory Action Research, which is based on critical pedagogy, is implemented by numerous university programs to help teachers solve everyday problems in the classroom by implementing a 'how to' approach (Gay, et al., 2009; Mertler, 2014).

Action research provides a way to gain knowledge to enhance learning and teaching (Mills, 2006). This PAR project was a collaborative activity between the Principal Investigator for the TELLs grant project who served as the instructor for EDU 514 Culturally Responsive Pedagogy in Practice, the Technology Coach for the grant project, and the teacher-participants enrolled in our courses. We used collaborative PAR in our quest for answers to the question: What is the best way to deliver and model online instruction for secondary in-service teachers enrolled in graduate summer coursework while supporting their wellbeing? Since all teachers, even seasoned professionals, had become new teachers during this unprecedented pandemic transition to remote learning, we determined that this research endeavor was a valuable pursuit for us as teacher-educators and the teachers who were participants in the TELLs grant project.

Participatory Action Research is socially responsive and takes place in context (MacDonald, 2012). Since COVID-19 precluded us from having the intensive three-week in-person seminars held on campus like the cohort members had participated in during the previous summer, we had to figure out how to take our face-to-face graduate courses and reconfigure them into an online format. The results of this process were thought to be a short-term, temporary adjustment, but with surging COVID-19 cases and the imposed restrictions, online instruction has turned into the 'new normal' for students and teachers. We wanted to provide a model for our teachers to adapt for their students in the future, so we spent time repurposing our in-course activities.

Our approach to disciplined inquiry allowed us to reflect on our teaching and have the research inform the redesign of our instructional practices while expanding our participants' pedagogical repertoire and self-care skill set. This PAR project prepared all participants to deal with technostress and other work stresses by recognizing and actively addressing them. Participatory Action Research contributes to evidence-based advocacy; the goal of PAR is to build a community's or group's capacity to analyze issues and solve

problems by making sense of theory and applying the knowledge gained. We were fortunate to engage participants within the PAR design across every stage of our research process. The teachers were invited to participate in the research by sharing their ideas and thoughts on pedagogical practices during numerous dialogues and conversations and providing written feedback when appropriate.

Since the participants in the study were all secondary teachers and had just experienced the transition from face-to-face to online teaching, they were asked what they perceived to be their most significant challenges. We found that some had no experience teaching online, some were concerned with internet connection issues, and others had worries about adapting student-centered instructional strategies for this new context.

We explored the D2L learning platform limitations and options available to us through our university and determined how best to transition our summer courses to online instruction. We focused on connection before content. We looked at ways to engage our teachers before covering the course material. We invited our graduate research assistant and an Instructional Coach from the TELLs grant project to participate in our course sessions so that the course instructor and Technology Coach had assistance when teachers were put in breakout rooms. We decided on a later daily start time and pushed back our meeting schedule by an hour. We prepared two introductory sessions to introduce the D2L platform features and navigate course content. Teachers shared with us that they wanted opportunities to network, and we built-in 'check-in' chats at the beginning of each class session and set up daily office hours. Our grant administrative assistant was available if teachers needed help interfacing with the university system. We shared that the University Information Technology department and D2L nationwide hotline offered technology support at all times. All course materials were distributed ahead of time. Recursive discussions took place to ensure the success of all teachers. İt became apparent that the teachers wanted and expected us, as teacher educators, to model how best to engage students via remote online learning.

Utilizing PAR allowed us to examine, reflect on, and assess our standard delivery and investigate various instructional strategies and techniques to address the concerns we uncovered around delivering online instruction in a culturally responsive manner to support teachers' retooling effectively. We also investigated and modeled how to best support teachers' self-care as a catalyst to support student wellbeing.

Ethical Considerations

This OLEA grant project was reviewed by the University's IRB committee and was given approval. All secondary teachers in the TELLs grant project signed consent forms to participate in the professional development opportunities offered. Once we made the transition to vitual online teaching, participants in Cohort 3's summer courses agreed to have all Zoom sessions recorded including instructional times, informational sessions, office hours, and other informal chats. The particpants had access to review all files through the

content management system. The participants also had access to provide feedback on the University's course evaluation. In addition they were asked to provide feedback on a Qualtrics Survey addressing the value of the professional development of this grant project.

Participants

We focused on inviting core curriculum (English/Language Arts, Math, Science, and Social Studies/History) secondary teachers from schools in our consortium partner school districts on or near reservations with high percentages of American Indian and other ELLs to participate in the TELLs grant project cohorts. Approximately 65% of the 34 teachers in Cohort 3 held a bachelor's degree, and the remaining teachers had completed their master's. The teachers had a vast array of teaching experience, ranging from 3 to 22 years, with an average teaching experience of 8 years. Twenty-two participants were K-8 certified teachers who taught various subjects at the middle school level. Twelve of the teachers were high school teachers: English/ Language Arts (6), Social Studies/History (2), and Math (1). The other 3 participants were Indigenous Language and Culture Teachers. Many of the teachers held additional endorsements in Reading, Special Education, Health Enhancement, Art, Music, German, Socio-cultural Anthropology, Library, Native American Studies, and Medicine Wheel Traditions.

Data Collection

We selected numerous vehicles to collect and triangulate our data, including logs of our instructional team planning meetings, our daily field notes, quick surveys/polls in introductory Zoom and D2L/Brightspace sessions, notes from informal conversations before and after the online course meetings, discussions recorded during Zoom office hours, email correspondence, discussions during synchronous class breakout room sessions, messages posted in the chat, Zoom session recordings, as well as formal course evaluations and feedback surveys. Data from these sources were collected and analyzed for common themes about the teachers' experiences with the online environment compared to their face-to-face instruction in the TELLs grant project coursework the previous summer.

The data gathered through the open-ended questions to which teachers responded on the course feedback survey were pertinent to identifying the five themes the teachers enumerated. They were supported by the other data listed above, which were collected, reviewed, and coded. We added the two additional questions listed here to the end of the semester Qualtrics course feedback survey, which was distributed electronically to enable the teachers to reflect on their experiences as learners in our online courses.

1. Since we had to transfer the TELLs Culturally and Linguistically Diverse Education certificate coursework to online instruction due to the COVID-19 restrictions, what challenges and concerns about being in a synchronous online course format for EDU 514 and EDU 513 this summer did you have?

2.   As an educator, what has been the most challenging aspect of juggling your teaching responsibilities, family/personal commitments, and participation in the TELLs grant project?

Data Analysis

Using thematic analysis allowed us to review our data set consisting of various formats, and sort and interpret the data into broad themes (Braun & Clarke, 2006; Lorelli, et al., 2017). The framework for our thematic analysis was done by following this six-step process: 1) familiarizing ourselves with the data, 2) making notations next to essential data to help us develop very general issues and then coding the data, 3) generating themes, 4) reviewing those themes, 5) defining and then naming our themes, and 6) compiling a report on our findings (Lorelli, et al., 2017).

We read our data numerous times to become immersed in the data and identify meanings and patterns. Once we completed a thorough review of all of the data we had collected, we highlighted and color-coded terms and phrases that appeared frequently. We used a deductive approach to tease out themes we anticipated such as the ideas that technostress created anxiety and the work-life balance in a virtual context is challenging. The analysis was expanded to include other themes that appeared. Next, we combined several codes, identifying patterns, and generated themes.

The trustworthiness of the research was enhanced through member checking by all participants through the course recordings, participant survey responses, and personal communications among course faculty, Instructional Coaches, and the Technology Coach. Access to recordings of all introductory Zoom and D2L/Brightspace sessions, class meetings, course activities, and office hour discussions was posted on the content management platform. Participants were provided ample opportunities to review the recordings and comment on their authenticity and accuracy.

RESULTS

We were able to identify the following five themes to describe the teachers' experiences taking remote coursework and participating in multi-hour, daily synchronous online sessions: (a) juggling multiple demands in the home environment while learning online is distracting; (b) balancing work-life responsibilities is challenging; (c) teaching and learning in a virtual context is isolating; (d) dealing with technostress is overwhelming and (e) practicing self-care allows teachers to support student wellbeing.

Table 1

Tabulation of Themes

Analytical Themes	Descriptive Terms	Needs that Emerged
Juggling multiple demands in the home environment while learning online is distracting.	Distractions, Zoom fatigue, Change fatigue, Blurred boundaries, Numerous responsibilities	• Realistic Expectations • Modified assignments • Time • Making sure children are safe and secure • Understanding participants' responsibilities • Modifying schedules • Learning platforms, and apps
Balancing work-life responsibilities is challenging.	Balance, Family-work demands, Personal time, Multi-tasking, Workaholic culture, Trouble focusing, Blurred boundaries, never having enough time	• Focus attention • Set aside time for family and friends • Ask for help • Learning how to prioritize tasks
Teaching and learning in a virtual context is isolating.	Isolation, Missing shared mealtimes, Informal discussions	• Provide longer breakouts • Checking in with everyone • Opportunities to socialize • Building online communities
Dealing with technostress is overwhelming.	Techno-overload, Invasion, Complexity, Insecurity, Uncertainty	• Training • Support • Office hours • Reducing anxiety
Practicing self-care allows teachers to support student wellbeing.	Burnout, stress, anxiety	• Address emotional, physical, and mental needs • Recharge

Even though we identified these five distinct themes, there is overlap among them. Here we share the teachers' feedback, our interpretations, and the relevant research on each of these themes. All the participants' quotes that were selected for inclusion and interwoven throughout represent what the teachers shared. To ensure the confidentiality and anonymity of our participants, we chose to remove the contributors' names.

Juggling Multiple Demands in The Home Environment While Learning Online is Distracting

Several teachers talked about the difficulty of putting work-home boundaries in place and adhering to them while they were addressing the expectations of their online courses and dealing with family matters. The teachers shared that trying to participate in our daily synchronous sessions while at home was very distracting. One teacher described missing the protection that being on campus the summer before for the face-to-face sessions had afforded her, "... life, in general, was challenging because I wasn't able to be on a campus where I could have had total devotion to the classes. Being home presented other life factors that hindered my concentration and time."

Several of the teachers are parents, and they highlighted the juggling they had to go through to make sure their children's needs were met. At the same time, they tried to focus on their coursework. They emphasized how torn they felt and how challenging it was to stay focused, as demonstrated here: "Childcare and making sure my kids were safe while trying to fully engage in what was happening on the screen was so difficult." It was evident that the teachers were juggling numerous responsibilities while trying to participate in the courses. Another teacher had this to share: "Too many distractions from home. When I was in Boxville, on campus, I was in Boxville, and I didn't have to worry about cooking, cleaning, answering phones, etc. I picked up take-out, worked with no distractions at the hotel room, and took walks or explored the city, or shopped when I needed breaks. I do not take breaks at home or have as much time to work."

Another teacher voiced how in addition to attending the synchronous online sessions, preparing for presentations/discussions and carving out time to complete readings and other homework was very challenging, "It was hard to get all of the schoolwork done because of life happening around me. I had animals to care for - I had to cook and clean - I had interruptions and distractions. When you're in class at home, you don't have the time to do everything else."

Some teachers recognized early on how distracting online learning was for them while they were trying to take care of their families and participate in the online course sessions. Therefore, they called for backup as demonstrated by this teacher's explanation, "Making sure my kids are safe while trying to engage in online learning was so challenging. I ended up having my mom stay with us from California for three weeks. It was a huge sacrifice for her, but it helped me to be able to focus. It was also difficult for my kids to understand that

I still had a ton of reading/writing/thinking to do when I wasn't 'in class,' and there were a lot of tears about mom not being available while I was home."

To address the distracting elements that teachers identified, we revamped our coursework for the online format. One thing we changed was we reduced the number of assignments, selected key resources to share instead of sharing all our materials, and built-in time to spend on inevitable technology challenges, in addition to making many otherchanges to our curriculum. Even though we made these revisions, we had to adjust our expectations once we saw that the teachers in our summer courses fell behind and became very stressed over the daily course requirements. Since our teachers reported that being asked to complete daily assignments resulted in considerable anxiety, we modified the course demands by adjusting the grading scale. Even though we still expected homework to be turned in every day, we opted to provide copious, practical feedback to the teachers. We changed the standard letter grade A-F scale to two simple ratings, "Revise and Resubmit" or "Good to Go". That way, teachers could work at their own pace without pressure. When they finally received the second comment listed above, they knew they had completed that course component.

Having experienced how distracting remote learning can be and how pressured they felt by the intense pace of online learning, many of the teachers shared that they could understand the plethora of demands on their students' time in and outside of school. The teachers believe students could be distracted by family members (parents, grandparents, and siblings), pets, and things going on in their homes as they were. They discussed how they would be more flexible with due dates and more understanding of the time required to produce quality work. They planned on limiting the assignments they would give their students and modifying the time students are expected to be online.

Another element we addressed was how to modify a virtual learning schedule and why it is necessary to adopt a traditional school schedule since the pacing is so different in the two environments. It was decided that the teachers needed to adopt a realistic virtual learning schedule for their secondary students and respect students' time commitments and hectic schedules. After experiencing more than 5 hours of daily synchronous class time during the summer, the teachers decided that expecting their students to be online for a 6-8-hour school day was not realistic. Instead, they agreed that the recommendations by the National Board of Professional Teaching Standards (NBPTS) on appropriate time students could be expected to be learning online would be sustainable (Hudson, 2020). NBPTS suggests middle school students should only be expected to spend 2-3 hours in online classrooms per day, and the expectation for high school students can be increased to 3-4 hours daily. It was also important to consider what portion of the time should be dedicated to synchronous teacher-directed lectures and discussions and what time students need to devote to asynchronous work on projects, activities, and homework.

We had numerous discussions on using analogous synchronous meeting apps like Zoom, Adobe Connect, WebEx, Google Meets, MicrosoftTeams, and other technology tools and how they can foster a sense of connection. Still, they do not replace the face-to-face physical interactions we have with students in the traditional classroom. We talked about the negative impact of 'Zoom Fatigue', the slang term which captures how taxing online interactions using the apps mentioned above can be on our brains and how simple stretching, walking, and snacking breaks every hour could reduce muscle tension, irritability, and eye strain (Chiappetta, 2017; Umayam, 2020).

The teachers agreed that they needed to feel comfortable accessing the features video communication platforms such as Zoom and other apps offer and have confidence navigating learning management systems like D2L/Brightspace, Blackboard, and Canvas. Teachers agreed that experiencing online learning as students was a valuable experience and provided them with a lot of empathy for what their students are and would be going through, and clarity on the rewards and challenges of remote teaching (Roy & Boboc, 2016).

Balancing Work-Life Responsibilities is Challenging

As is the case in the healthcare field, a paradigm shift in the education system is needed since many educators are immersed in a workaholic culture which has only gotten more burdensome since the coronavirus pandemic (Wan, 2020). Work-life balance requires teachers to manage the many roles for which they are responsible efficiently. Since transitioning to what some of the teachers in our grant project affectionately referred to as 'Zoom school', the balancing act has become more complex. Teachers need to learn how to set boundaries to protect their mental health so they can be there to support their students' success and nurture their familial relationships, but many struggled with finding a healthy work-life balance (Hansen & Gray, 2018). Several teachers acknowledged being out of balance and admitted that the prospect of regaining stability eluded them, "I never had a good work/life balance, to begin with, and this pandemic just added to that." Teachers, like everyone else, deserve to be able to divide and spend their time among work time, family time, personal time, and time for other things like self-care, guilt-free. With numerous demands, as one teacher shared, "Focusing has been the hardest part. I'm a single parent, so I'm always trying to take care of my daughter, and then focus on the classes, and homework whenever she is sleeping."

Learning how to prioritize tasks, implement efficiency tools to work smarter, minimize time spent on administrative details and operationalize efficient time management were goals the teachers wanted to explore. In our many discussions, some teachers focused on separating their work and life roles, while others were interested in how best to blend them. Teachers described their core values and the importance they placed on family, their commitment to their students, their community involvement, nurturing relationships with extended families and friends, their spiritual practice, and continuing

their professional development. Infrequently self-care was mentioned in our initial meetings, as if it were a taboo not seen as a priority at all, until mid-way through the summer courses when we started focusing our pre-and post- synchronous class session chats and virtual office hours on strategies for avoiding technostress, building online communities, and maintaining teacher wellbeing.

Teachers shared how they often split their time between work and caretaking, which left no time for themselves, as evident here, "The weeks we had class online, I literally could not do anything else. I told my husband he was on his own. I worked all day and night to stay on top of the workload. Nothing was cooked, cleaned, or laundered during those two 5-day stints. In the 'off' weeks, I had to pace myself and stick to a strict schedule to make sure everything at home got completed."

The teachers were eager to inquire about available tools, strategies, and resources their peers used to manage the constant inventory of tasks they were required to address for work. Everyone agreed their lives had become more complicated (some used the term impossible) to meet professional obligations and juggle their familial commitments since the beginning of this unprecedented pandemic. The teachers communicated that the ever-shifting changes brought on by the coronavirus put them in a constant state of uncertainty. One teacher described it this way: "I feel like we are being asked to put out continual and ever-changing fires." The teachers agreed that dealing with this type of recurring work overload has made goal setting, identifying priorities, time management, and creating a balanced scorecard unrealistic. We talked about how this pressure could easily lead to low job satisfaction, unmanageable stress, and eventually, burnout. Teachers also highlighted how torn they felt, trying to satisfy everyone's demands, "Juggling was a challenge. When I am home, I am pulled in many directions, such as being a teacher and answering to our district, my home business, my husband's business, being a mom, and all that goes with that. I am usually up late at night trying to write and get assignments in and am exhausted the next day. I feel like I was always playing catch-up and never catching the rope."

Since the online classroom has no real boundaries, separating, balancing work, and other roles left many teachers feeling like there was never enough time in the day. To prioritize and conquer the never-ending to-do list, teachers discussed applying the late businessman and author Stephen Covey's four-quadrant time management matrix, where Covey suggests plotting all tasks focused on two dimensions, importance, and urgency, to help set priorities and work efficiently (Covey, 1989).

The teachers also pointed out that although students may enjoy the flexibility associated with online asynchronous learning, which allows them to decide when to focus on their schoolwork, as teachers, they were overwhelmed by remote delivery since there are no natural boundaries. They ended up feeling like they were expected always to be 'on' (Hansen & Gray, 2020). When they were the instructors, the teachers said that they felt compelled to respond to posts and check their email and other accounts all day long, every

day. According to Hansen and Gray (2018), improving time management and boundary-setting skills is essential to job satisfaction when teaching online.

The popular phrase in education circles, "Maslow before Bloom", emphasizes the necessity to take care of students' basic needs before focusing on academics. The same philosophy can and should be applied to meeting teachers' needs. Managing the aspects of your professional life adds to job satisfaction. Still, with the relentless changes that inundate us in a virtual environment, this can add significant stress. Teaching concurrent courses, or teaching courses with high student counts, can be very time-consuming. Suggestions for working efficiently by managing remote learning include:

- Provide students with clear communication of the best way to contact and interact with you.
- Note your availability.
- Set clear boundaries and realistic expectations.
- Share instructional videos about the technical processes and procedures for the class.
- Have students ask for help from technical support when needed.

It was felt that these suggestions would make teaching online a less time-consuming activity allowing for more balanced work-life conditions.

Teaching and Learning Online Is Isolating

Teaching can be an isolating profession. After all, teachers are often the only adult in a classroom surrounded by children or adolescents. Even though teachers may be in a crowd, they are not among their peers. Now that we have transitioned to remote instruction, teachers do not even have the occasional encounters with their colleagues in the school hallways, the cafeteria, the teacher's lounge, etc. Consequently, many teachers voiced missing social contact with their coworkers, and with their peers in the grant project. One teacher summed up how different this summer was compared to the face-to-face instruction we provided last summer, "It just felt less like the community learning that being in a classroom afforded us last summer."

Another teacher said she could empathize with her students, "This was very difficult for me, and I think it gave me a taste of what my students felt. I really missed the informal discussions and the opportunity to ask questions when the question was on my mind." Teachers also missed shared mealtimes and reminisced about the breakfasts, lunches, and dinners they had shared the previous summer when they lived in the dorms on campus. One teacher said, "I loved making coffee and chatting with everyone before class. I loved the Famous Dave's barbeque dinner and all the working lunches where we talked about our assignments."

Providing the teachers with the opportunity to chat with their peers about what was going on in their lives, in addition to letting them commiserate, was very important. Even though we had sorted the teachers into breakout sessions regularly during the synchronous class sessions to participate in course activities, teachers asked for. Opportunities were provided for them to share what was going on in their lives. One teacher described this common sentiment: "I feel frazzled. I just need to vent."

We had near-perfect attendance for the synchronous sessions. Several teachers requested to be admitted into the Zoom sessions way before the start time. Many stayed after the sessions ended to hang out and chat and still others attended the virtual office hours regularly. Sometimes they had a question on the assignments; sometimes they wanted to discuss the course content; from time to time, someone had a professional dilemma they wanted advice on, but often teachers just longed for adult companionship and felt like hanging out with us. "I don't have a question. I just like being here with everyone," was a typical comment. Another teacher shared how impersonal communicating through computers seemed, "I missed interacting and being with my peers to brainstorm and support one another on projects. I cried several times due to frustration, things out of my control, connectivity, and the lack of human interactions. Zoom just isn't the same."

Another popular discussion was how teachers could battle the feeling of isolation and emotional and mental strain that comes from teaching remotely. In addition, finding opportunities to connect socially and perhaps team-teach were suggestions teachers made to address their loneliness and the following feeling, "The challenge I had, was not having my colleagues to collaborate with in person."

We modeled how a collaborative partnership focusing on engaging activities helps maximize interaction and gives everyone involved a chance to connect in the online context. One of the most popular activities we revamped for the online environment was a team-building exercise focusing on nonverbal communication, which involved correctly ordering images from István Bányai's book, *Zoom*. In preparation, we scanned and edited the images and selected Google Drawing to randomly distribute the images. Then the teachers joined through the Google link, and collaborated in real-time. Participants were asked to put the images in order without speaking. Having the teachers work in silence was an easy task; we just had to mute everyone's microphone in the video chat system. The discussion afterward focused on ways they could overcome remote barriers and connect in a productive, rewarding manner. One teacher had this to say about this powerful lesson: "I loved interacting with my cohort! I also especially loved the chance to 'talk' to my fellow teachers! I'm thankful to have been a part of it!"

Dealing with Technostress Is Overwhelming

In the 1980s, Brod, a pioneer in the field, described technostress 'as a disease' caused by an inability to adapt to computer technologies (Brod, as cited in Efilti & Coklar, 2019, p.

413). Nowadays, technostress is defined as anxiety or incompetence individuals feel while adapting to ever-changing technologies (Efilti & Coklar, 2019). Tarafdar, Tu, and Ragu-Nathan (2011) identified five conditions that are common causes of technostress: overload, invasion, complexity, insecurity, and uncertainty. The teachers concurred that they had been impacted by these aspects of technostress in their roles as both teachers and learners.

Techno-overload describes the ubiquitous nature of technology and highlights the pressure teachers feel about working more efficiently and faster when using it. Teachers expressed this overload stress from their administrators, who all too often assumed that since they were doing online learning, teachers could take on more classes or add additional students to an existing course. Teachers admitted that they were guilty of inadvertently causing technostress for their students by posting more assignments and/or projects than usual just because everything is online.

Techno-invasion is the reality that we can be reached anytime and anywhere (Tarafdar, et al., 2011). As addressed earlier, this assumption has resulted in blurred work-life boundaries. Teachers already spend extra time outside of their contractual expectations helping students, but now students can contact their teachers any time, and they anticipate immediate responses. Techno-invasion makes it hard for teachers to set aside time for themselves and, therefore, creates added stress.

Techno-complexity is the inordinate amount of time and effort teachers need to invest to master and effectively implement and manage new technologies. The teachers agreed that this expectation was the primary cause of the technostress they experienced as both teachers and learners. Since the abrupt transition to remote instruction and learning online this past spring semester came with no warning, teachers felt and are still feeling like they had to 'hit the ground running.' Many of them shared that they had received minimal to no professional development to help them redesign their curricula for the online environment. One teacher shared, "I had never taught online. I had a two-day training on Canvas, and now I am supposed to be an expert."

Many teachers feel the pangs of techno-insecurity since they are afraid that an inability to adapt to an online environment could result in job dismissal. Lastly, the closely related techno-uncertainty is compounded by the ongoing changes to never-ending technology updates. The demand for online learning software, video conferencing tools, and content delivery platforms keeps adapting to the COVID-19 restrictions and the evolution of teaching and learning.

Technostress has several different effects. One effect is that with the use of technology, teachers' office hours are extended, and teachers feel overloaded because work interferes with their roles at home (Johnstone, 1989). Technostress can also cause job dissatisfaction because of the frustration of using technology (Tarafdar, et al., 2011). Teachers are often left feeling overwhelmed or intimidated by technology when there is a system crash and lost

time. One teacher stated, "Trying to do tasks using new technology I was not familiar with, was the most challenging, because I felt rushed trying to learn something new." Teachers might also suffer from physiological symptoms such as fatigue, irritability, insomnia, frustration because of the increased mental loads and time pressures (Brovio, et al., 2018; Chiappetta, 2017).

We explored ways to minimize the technostress the teachers in our course were experiencing so they could use our strategies with their students. In the face-to-face classroom, an interactive timeline project in EDU 514 allows students to complete a jigsaw activity where they summarize key dates and events from the course readings that highlight the evolution of the Indian Education for All (IEFA) act. Usually, a whiteboard with instructor selected timeline dates and sticky notes where students collaboratively record and display the events were used to create a cohesive, graphic timeline. We wanted to include this powerful activity in the virtual environment, so this was one activity that needed to be redesigned to be used in an online setting. There are many options for virtual whiteboards, but several of them would require students to learn another application to use them effectively. Since our students were already using Google apps in our courses, it seemed reasonable to explore the capabilities of that application for the timeline activity. Google Slides fit perfectly for the conversion. The blank timeline was created with all the dates and information bubbles, and students, working in breakout rooms, were assigned specific dates to review. To share their findings, the students typed their contributions into the textboxes. Students were given the link to the Google slide in the Zoom chat, and working in groups, they filled out the timeline as seen in Figure 1. Variations of this interactive activity are something that teachers could use with their students.
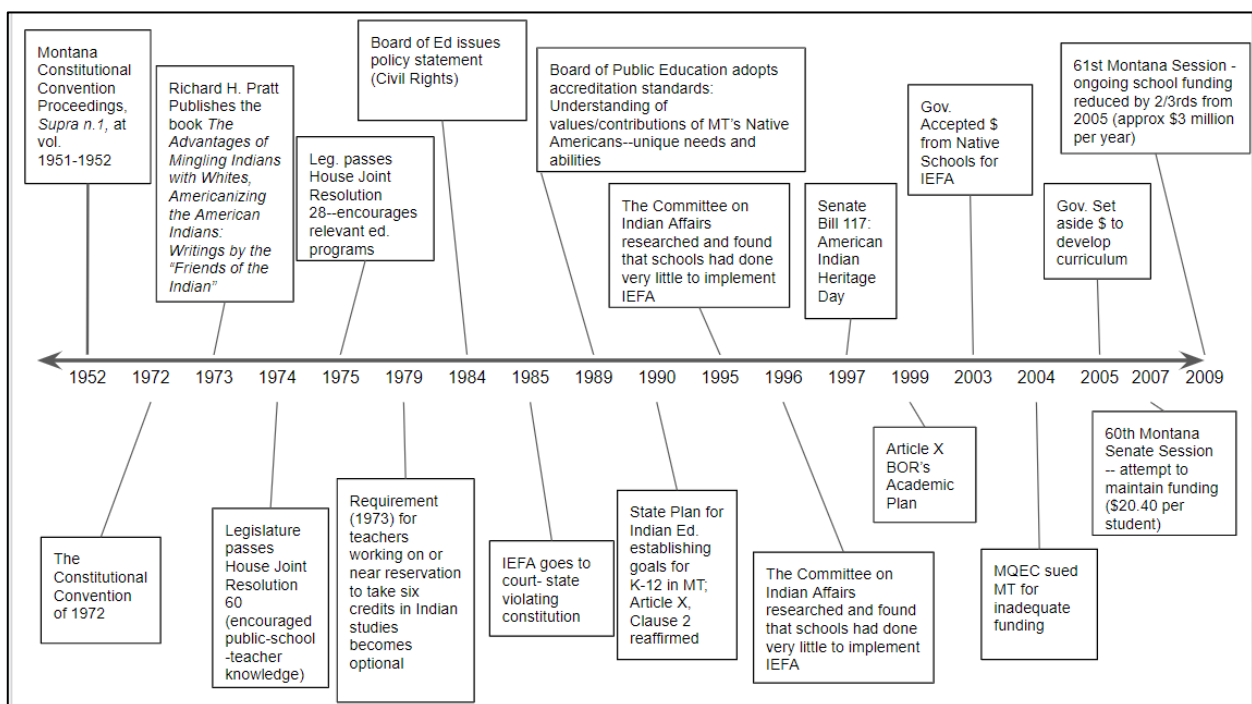
Figure 1. The EDU 514 IEFA timeline activity.

Another way to support teachers is to provide ongoing training and support materials to reference (Tarafdar, et al., 2011). For example, we offered two information sessions before our summer courses started. In the first session, we covered the D2l/Brightspace and Zoom basics like obtaining log-in information, connecting to the synchronous sessions, and accessing the course materials. When we polled the teachers in the first training session, we found that more than a quarter of the teachers had no online teaching experience before the spring 2020 migration to remote online learning. Novices who were unfamiliar with D2L/Brightspace voiced their concerns. One teacher shared his impressions: "It was very challenging to use new technology. I had a hard time staying organized and understanding what was going on." We recorded all sessions, so the teachers could refer to them when needed. Students valued the information sessions evidenced by this student's quote, "A shout out to our Technology Coach whose tech guidance made the process a lot smoother than it might otherwise have been."
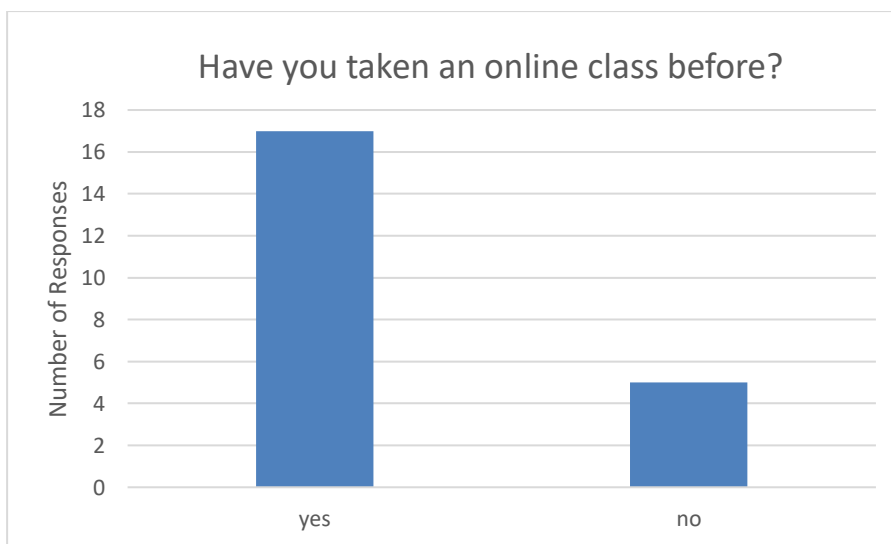
Figure 2. Responses from participants attending the information session before EDU 514 started.

Another way to minimize technostress was to engage in metacognitive practices by informing the participants why we decided to use the technology tools we selected and how they were supposed to enhance the teaching-learning process. Sharing the reasoning for our technology choices and involving the teachers in their effective use resulted in a more substantial buy-in from the teachers. This process also helped alleviate the participants' feelings of uncertainty. We also let them know that we would be available for help when things inevitably did not work like they were designed to work.

Another way to minimize technostress is to provide live tech support since there will always be issues when moving classes online. Being available to support students during office hours and providing contact information for IT support helps with technostress, but learners often need immediate assistance when issues occur during class time. It helps to have someone serve as your technology support person during the synchronous sessions of the course. Having to oversee the technology snafus that occur and monitor the instruction

detracts from sound pedagogy. Having someone take care of the technical issues that arise by helping students to connect, to play videos for the session, to sort students into the breakout rooms, to monitor the Chat, etc. allows the instructor to focus on the content delivery. When there is limited synchronous meeting time, every minute counts, and losing time fixing technical issues is frustrating for both the teacher and the students. Even if teachers do not have the advantage of a Technology Coach by their side, they could ask a knowledgeable student or arrange with another colleague to step into the role.

Our state has many rural dead zones with inefficient internet connectivity and very slow bandwidth. Several of the teachers voiced concern over their connection and equipment. One teacher shared, "Technology, in terms of my own hardware, and connectivity - which is lacking in my area, was really problematic, really stressful, and frustrating. There was an additional expense to me in that I had to get cell service for my iPad, and I had trouble accessing Word from the university even though I was told it was available and free but downloading was a pain. That could have been a connectivity issue." Connectivity and equipment issues often lead to aggravation when the technology prohibits you from participating, disrupts your ability to communicate successfully, or puts your credibility into question and results in mutual frustration. These issues are factors teachers said they would consider when instructing their students online.

Other teachers who had never taken an online course found locating the announcements, course content, and assignments difficult. Another teacher shared, "The only challenge I faced with the online model was locating materials at times. It took me longer to navigate D2L because there were so many resources to dig through."

Managing the aspects of your professional life adds to job satisfaction, but with the relentless technology changes that engulf us, this can add significant stress. As stated before teaching concurrent online courses, or teaching remote courses with high student counts, can be very time-consuming. Advice we shared for designing and managing remote learning included the following: spend time creating a virtual presence, provide students with clear communication of the best way to contact and interact with you, review Netiquette, i.e., the expected ways students are to interact with everyone in the class, note your instructor availability and protect your boundaries, lay out clear expectations, focus on trust-building and cooperative learning, and ask for help (Efilti & Coklar; 2019, Roy & Boboc, 2016; Welch Brasfield, et al., 2019).

Practicing Self-care Strategies Allows Teachers to Support Student Wellbeing

In our world today, stress is epidemic. In addition to the stress generated by the COVID-19 global health crisis and the current economic, social, and political crises in the United States, teachers are suffering from an overabundance of work-related stress since the transition to online instruction in the spring of 2020 and consequently their wellbeing is in jeopardy. According to the World Health Organization, wellbeing is described as "A state

of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (Devaki, et al., 2019, p. 34).

Providing support for teacher wellbeing is paramount since it may relieve the professional stress teachers are suffering from and deter them from leaving the profession (Welch Brasfield, et al., 2019). Addressing teacher attrition is key since "although the experience of stress or burnout is exceptionally damaging to the individual, the occurrence among educators has a deleterious impact on their student populations." (Welch Brasfield, et al., 2019, p. 167).

Interventions that support teacher resilience have been found to promote job satisfaction and retention (Devaki, et al., 2019; Eyal, et al., 2019, McClintock, 2020). Therefore, we need to foster workplace wellbeing and create, implement, and maintain wellness programs for teachers by creating supportive work environments, alleviating the stigma associated with taking care of oneself, and increasing teachers' coping skills to deal effectively with stress and anxiety. Thinking of teacher wellbeing, not as an expense but as an investment, not as self-indulgence, but as self-preservation, not focusing on 'me first' but on 'me too', will benefit teachers as well as everyone else (A. Khawaja & C. Broady, personal communication, August 10, 2020; L. Thum, personal communication, August 19, 2020).

Stress is a natural part of life; it is our body's response to harmful situations. Even so, there is a distinction between what Stiglbauer and Zuber (2018) referred to as challenge stress, as opposed to hindrance stress. Challenge stress can be positive and can push us to achieve goals, but hindrance stress or chronic debilitating stress, can cause significant mental strain and lead to serious health problems. Since chronic stress can interfere with one's ability to cope with daily responsibilities, and all the teachers in our courses shared that these have been very stressful times for them, they felt they had to commit to practicing self-care by learning techniques to handle their stress and manage negative emotions.

There are physical, emotional, and mental effects of stress on the body. Several teachers shared that they suffered from a combination of emotional, physical, cognitive, and behavioral symptoms, as described in a workshop offered by a licensed psychologist at the university (L. Thum, personal communication, August 19, 2020). We talked about the various symptoms associated with stress and brainstormed an expansive list highlighting the ways stress had manifested in our lives. During office hours, one teacher shared, "I can't think straight; I crave 'me' time."

Stress symptoms fall into the following categories: emotional, physical, cognitive, and behavioral (A. Khawaja & C. Broady, personal communication, August 10, 2020; L. Thum, personal communication, August 19, 2020). Emotional symptoms were at the top of the list the teachers shared and included these escalated characteristics: irritability, moodiness, frustration, feeling overwhelmed, not being able to relax, feeling depressed, and shutting down. The teachers shared that they suffered from the following physical symptoms: a lack

of energy, sleep disturbances, insomnia, digestive issues, headaches, frequent colds or flu, digestive problems, and a compromised immune system. Cognitive symptoms included: constant worrying, a racing mind, disorganization, lack of concentration, negativity, and an inability to focus. Behavioral symptoms the teachers shared were changes in appetite, a tendency to overindulge, procrastinating, and an increase in nervous behaviors, bad habits, and common vices.

We had several discussions around these stressors in the teachers' lives and what they could do to practice self-care. The teachers talked about numerous mainstream and alternative therapies they had tried to reduce their anxiety and stress. Some of their suggestions were as simple as focusing on breathing. "When I am super stressed, I remind myself to breathe. I focus on simple box breathing. I inhale, hold my breath, and exhale, all to a count of four. It immediately calms me." The teachers shared an assortment of breathing techniques they practiced. Others shared that deep belly breathing exercises could help them manage difficult situations under extreme duress. Other strategies the teachers had tried included: sipping calming teas, listening to soothing relaxation tapes, keeping a gratitude journal, chatting with a friend, going for a walk or a hike, or just spending time outdoors. "We are so fortunate to live in this state. Just getting outdoors in nature can instantly change my attitude." More time-consuming and complicated strategies the teachers tried included:

- Completing trauma training.
- Attending virtual retreats.
- Signing up for biofeedback therapy.
- Enrolling in self-care E-courses.

"I attended a Deepak Chopra three-day virtual retreat. It was so relaxing, so refreshing. It did me a lot of good."

At the top of everyone's list were exercising regularly and eating healthy, well-balanced meals, considered 'musts' in avoiding stress-related disorders. In addition, teachers shared seeing the most significant mental health benefits from adhering to the following practices: mindfulness-based stress reduction, a range of meditation techniques, tapping therapy, Tibetan singing bowl therapy, aromatherapy, acupuncture, reading self-help books, journaling, practicing gratitude, self-massage and other forms of massage, and mind-body activities like tai chi, jogging, and yoga were also popular.

The teachers believed that having a positive attitude was very important; "I am 'hooked on hope' and that is what has helped me keep a bright outlook during these crazy times." We discussed how important it is to validate and normalize how we feel when we are not feeling well. Since it is human nature to experience life's ups and downs, we agreed that it was helpful to acknowledge that there are times when we are feeling distressed, disappointed, and upset, and those feelings are normal. So, we want to eliminate judgment

and shame and accept that sometimes, as one teacher shared, "I remind myself; it is okay to not be okay."

The teachers also shared that they would be applying the ten minute-rule and not letting the technostress and frustration they experienced when they could not get the technology to cooperate raise their blood pressure. "After ten minutes of focusing on a technology issue, if I cannot solve it myself, I would apply the ten-minute rule and reach out to tech support." Belonging to a support group was also viewed as an essential practice. The teachers expressed how vital being part of this grant project cohort was for them. "The networking possibilities were endless and, commiserating with fellow educators helped me feel like the popular mantra of *we are in this together*, applied to us."

Above all, teachers felt that accepting things that they could control and letting go of something out of their control would help promote their positive wellbeing. Teachers need to forgo their past teaching approach and focus on normalizing their *new normal* by embracing innovative ways to connect online with students, parents, colleagues, etc. to make teaching online feel less isolating and less stressful. The teachers also committed to being realistic about managing their time effectively and a sensible work-life balance in this new virtual context.

In a music video by Jon Bon Jovi addressing the COVID-19 health crisis, the rock star shares this advice in the "Do What You Can" song refrain: "When you can't do what you do. You do what you can." We all decided this was a great approach to distinguishing between what we can and cannot control in our personal lives, at work, and when dealing with technostress.

DISCUSSION

The Oxygen Mask Metaphor

We have all flown and heard or disregarded the flight attendants' over-rehearsed airline announcement relaying some variation of the Oxygen Mask Rule. The advice to place your oxygen mask over your mouth and nose should the cabin lose pressure before assisting others emphasizes how self-care is not merely an indulgence but a necessity if one is to be of service to others.

This oxygen mask annoucement is a pivotal procedure for ensuring survival because if you run out of oxygen yourself, you cannot help anyone else with their oxygen mask. This is a crucial metaphor for those who spend the bulk of their time caring for others (parents, caregivers, doctors, nurses, and, yes, educators). Taking care of others can quickly deplete those that serve as caregivers. When caregivers do not take care of themselves, they can experience burnout, stress, fatigue, reduced mental effectiveness, health problems, anxiety, frustration, and an inability to sleep, and perhaps if ignored for too long, their imbalance

may even lead to death. To avoid experiencing these symptoms, teachers need to replenish their energy and reserves to continue to meet their students' needs.

Student and Teacher Wellbeing

If we want our teachers to create supportive, welcoming school environments, we need to empower, respect, and support them. Since student-teacher relationships play an important role in student success, neglecting the untold toll of teacher stress and burnout which may culminate in a lack of teacher continuity, may negatively impact the teaching staff, and harm students (Welch Brasfield, et al., 2019).

The chronic absenteeism, disruptive student behaviors, traumatic events, substance abuse, bullying, violence, and other adverse child and adolescent experiences that students confront pervasively impact student wellbeing and, through vicarious trauma, teacher wellbeing (Eyal, et al., 2019). Therefore, it is pertinent that we keep the health and security of teachers and students alike as a priority. Although most of us would agree that teacher wellbeing is a crucial factor in promoting and nurturing student wellbeing and academic success, teacher mental health is often neglected (Devaki, et al., 2019). If teachers are depleted, they have nothing to give to their students and may not support student wellbeing effectively. Ultimately, "Teacher wellness has been related not only to teachers' physical health but also to steadiness in schools and teaching effectiveness and student achievement" (Devaki, et al., 2019, p. 35).

A demanding workload, the feeling of having to be always on, the lack of resources, limited time to prepare and collaborate with colleagues, minimal opportunities for professional development, and even less technical support in addition to the burden of ever-changing expectations have taken a toll on educators (Welch Brasfield, et al., 2019). During this pandemic, work-life boundaries have been blurred for many teachers trying to instruct their students remotely from their homes while caretaking their families and working through the same financial and health stresses as everyone else. Since the overburdened, overwhelmed, exhaustion teachers have always felt has been exacerbated by COVID-19 related stress factors, we must support individual self-care strategies and group interventions in schools for teachers to protect their mental health.

Coronavirus Unknowns: The Airplane Metaphor

This unprecedented pandemic has made learning quite challenging because the target is constantly moving as we strive to reach a new normal. The expression "Building an airplane while you are flying it" and its numerous variations, such as "Building the airplane as it travels the runway," are beloved clichés out of Silicon Valley describing the iterative process in software development (Walker, 2016). The emphasis is on developing a product, shipping it immediately, and fixing problems as they arise, in contrast to the earlier approach of working out all of the kinks before shipping a new product. With the abrupt transition to remote learning in March of 2020, lamentably, this expression describes what

teachers were expected to do to teach their students remotely last spring and what they have needed to figure out for this fall.

Technology Challenges

Anxiety abounds for a mixture of issues as mentioned here, but the angst, apprehension, nervousness, and pressure teachers feel when dealing with technological challenges may surpass them all since most K-12 teachers had minimal training to address online instruction and they have not been afforded substantial technical support once classes commenced. For those who choose to remain in teaching, experiencing the stress and pressures of being novice online instructors can cloud their attitudes and erode their resilience. After all, all teachers were new teachers under these circumstances, even veteran teachers. Although many schools across the nation have embraced a combination of technological tools, they have not necessarily adopted a new way of teaching and learning.

In many ways, these circumstances have resulted in a rude awakening for teachers and society alike. Schools face barriers to modernizing and re-shaping how instruction takes place. With the increase in K-12 online learning, teachers need to address certain misconceptions, namely that 'good teaching is good teaching' regardless of the delivery model. The truth is, the pedagogical foundation, instructional strategies, tools, and learning theories differ from one teaching format to another (Hansen & Gray, 2018; Welch Brasfield, et al., 2019). The assumption that the skills needed for face-to-face instruction are identical and transfer easily to online instruction is not necessarily accurate. Education needs a technology strategy, such as a paradigm shift where we examine teachers' roles and the competencies and skills they need to develop to effectively deliver instruction online (Roy & Boboc, 2016). Additionally, "Educational research, reforms, policies, and expectations from all aspects of society have set high academic standards for students and teachers, especially in terms of 21st-century skills" (Roy & Boboc, 2016, p. 285). Even though there is a consensus that these high expectations should be met, the onus of responsibility in reaching these goals cannot be placed on the teachers alone.

Online Teaching

Although online education and the accompanying research are quite popular in higher education it was not the delivery option most frequently used in the K-12 sector prior to mid-way through the spring 2020 semester. As a result, little had been written about the best practices to use with elementary and secondary students in online virtual classrooms before the pandemic. Due to the importance of creating meaningful opportunities for interaction among students, with the teacher as well as with the content being taught, online instructors wear many hats, including "facilitator, instructional designer, process facilitator, advisor, catalyst, e-moderator, etc.," (Roy & Boboc, 2016, p. 297). Therefore, K-12 teachers need adequate professional development and technical support to design and nurture student-teacher interactions and create dynamic online learning communities. Teacher

education programs will have to model and promote virtual instructional methods to address the stigma that online or virtual education summons. In-service teachers also need retooling.

LIMITATIONS AND RECOMONDATIONS

This section analyzes the strengths and limitations of using the PAR methodology and shares recommendations for future research. One of the limitations of our study is the low number of participants. With only 34 participants, it is hard to generalize our findings beyond our cohort of teachers. It would have been beneficial to collect data from several more groups of participants to increase the sample size, but that leads to the following limitation. Since this group of participants was the last cohort for the TELLs grant project, with no continuation of this CLDE certificate program planned, it was not possible to include additional participants. Another limitation is that with the rollout of the COVID-19 vaccines and plans for schools to schedule fall 2021 face-to-face instruction in the coming year, the university faculty, as well as the grant participants, may move away from exclusive remote online teaching.

The findings from our study confirm extensive support for the use of PAR as a starting point for more substantial, more inclusive advocacy work due to the positive transformative effects the participants reported from partaking in this online synchronous learning experience. Participants provided feedback that supported our virtual course design and PAR methodology, which allowed them to work collaboratively with 'their peers and the insider' community-based researchers, i.e., the Principal Investigator (the course instructor) and Technology Coach of the TELLs grant project.

By empowering our participants to share their lived experiences, we have gleaned a deep understanding of the teachers' authentic experiences as learners in our online graduate coursework and the implications of their experiences as online learners for their teaching practices in a virtual or blended context. This realization has provided us with the knowledge to adjust and model best practices for connecting with students in an online teaching-learning environment. Having had the opportunity to have the teachers on campus in face-to-face coursework the previous summer semester and meeting, observing and communicating with them throughout the academic year, as well as providing hands-on support through Instructional Coaching before the second summer of coursework, we already knew our teachers and their students and had some perceptions of their unique challenges.

Now that the secondary teachers involved in the third cohort of the TELLs grant project have completed their CLDE certificate coursework and their work with the Instructional Coaches, as well as have taught their students using a myriad of instructional formats during the 2020-2021 academic year, a follow-up survey asking participants to share which of the challenges as delineated in the themes they identified with as learners in their

synchronous courses came into play during their teaching experiences. In addition, other instructors of virtual synchronous courses in higher education or at the K-12 level could benefit by using the PAR methodology to collect data on best practices to develop their courses further to meet the needs of their students. In our context, a team-teaching approach where instructors with content knowledge and technological skill complimented each other, students were able to express their needs to provide the ongoing necessary course redesign.

CONCLUSION

In addition to the stresses everyone has been experiencing during this global health crisis, school teachers have had to cope with additional work-related anxiety. The abrupt transition to remote learning during the spring 2020 semester left several educators scrambling to carry out their instruction in a virtual environment with little training, inadequate resources, and minimal support. As dedicated professionals, teachers have been working tirelessly to meet their students' needs and create engaging, motivating lessons while revamping their curricula for the new context despite the fact they have been suffering from change fatigue.

Using a Participatory Action Research approach, secondary teachers in a professional development grant project could share their reflections on their participation as learners in online graduate coursework. We were able to identify the following five themes to describe the teachers' experiences taking remote coursework and participating in multi-hour, daily synchronous online sessions: (a) juggling multiple demands in the home environment while learning online is distracting; (b) balancing work-life responsibilities is challenging; (c) teaching and learning in a virtual context is isolating; (d) dealing with technostress is overwhelming and (e) practicing self-care allows teachers to support student wellbeing.

This study provides insights into the teachers' challenges and the strategies we modeled to address the technology and other remote learning issues. We discussed the consequences of stress, burnout, and attrition in teaching and the necessity for teachers to practice self-care. We wanted to mitigate the stress our teachers have been experiencing since the spring 2020 transition to online instruction and prepare them to better support their students during the upcoming academic year.

Unfortunately, teachers often ignore their wellbeing while putting their students' health and safety before their own with detrimental consequences. Since students' wellbeing is tied so closely to teachers' wellbeing, we focused on identifying and addressing how teachers could minimize stress and anxiety through promoting self-care. We shared the teachers' reactions to their experience as online learners and the accompanying stress they experienced. The teachers also discussed their experiences as online instructors, disclosed the related symptoms they exhibited, and shared recommendations to cope with stress.

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Research

How Relationships Impact Teacher Job Satisfaction

Cailen O'Shea[1]

Abstract:

This study aimed to extend the knowledge of teacher job satisfaction by specifically examining predictors at the teacher level. Several components of job satisfaction were examined for their hypothesized impact, including the focused predictor of teacher-student relations. Based on the United States sample in the Teaching and Learning International Survey (TALIS) 2018 data, the author explored this issue utilizing responses from 2,560 lower secondary school teachers nested within 166 schools. Using the transactional model of stress and coping (Lazarus, & Folkman, 1984) as a framework, the study found that teacher-student relationships are a positive and significant predictor of teacher job satisfaction. After controlling for relevant predictors, teacher relationships with their students were the strongest predictor of their job satisfaction present in the study. Discussions and implications are presented.

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INTRODUCTION

It has been well documented that a focus on teaching and learning provides the most significant influence on student learning (Robinson et al., 2008). The groundbreaking work of Grissom and colleagues (2021) has demonstrated paths at which leadership also impacts students, the vast majority of which begun their educational careers as teachers. With this in mind, retaining effective teachers has been, and should continue to be, a priority of educational leaders and researchers. This study examines one component of teacher retention, job satisfaction. According to DiPerna and Shaw (2018), teacher job satisfaction rates among K-12 educators continue to decline. Job satisfaction is a critical element to teacher effectiveness. It has been associated with lower absenteeism rates, reduced stress, turnover, and the use of innovative instructional practices in classrooms (Banerjee et al., 2016).

Teacher job satisfaction is a complex issue to understand because it results from teachers' assessment of work and their work experiences (Van der Ploeg & Scholte, 2003). These assessments can vary widely between teachers in different settings or even within the same teacher on a given day. This study seeks to understand how relationships impact teachers' job satisfaction.

Though teacher job satisfaction has been studied extensively over the past three decades (Aldridge & Fraser, 2015), little is known about the impact relationships with students have on teacher job satisfaction (Spilt et al., 2011). An in-depth interview study of 60 teachers found that relationships with students were the most important source of enjoyment and motivation (Hargreaves, 2000). Teacher-student relationships have also been mentioned as one of the core reasons teachers remain in their profession (O'Connor, 2008). Along this vein, in her study of teacher occupational commitment, Collie (2021) found that disruptive student behavior was a significant predictor of lower teacher occupational commitment. This finding is critical to the collective understanding of how relationships with students influence teacher job satisfaction. When the teachers in a building lack these fundamental relationships with their students, the students then are more prone to demonstrate disruptive behavior (Aldrup et al., 2018). In other words, for teachers to have higher levels of occupational commitment, they can foster more positive relationships with students to avoid disruptive behavior.

This balance between improved relationships and less disruptive behavior drives the relational conversation. Schools are caught in the middle of this as they are comprised of complex and intricate relationships. By examining teachers' direct perspectives, we can gain a more comprehensive understanding of the relationships that exist. Thus, bettering our understanding of teacher retention and, ultimately, school effectiveness. By examining teacher-student relationships, we can better understand the interrelations at play and their effects on teacher job satisfaction.

This study suggests that teacher job satisfaction is grounded in Lazarus and Folkman's (1984) transactional model of stress and coping. The primary premise of the transactional model is that coping strategies are mediated through the relationships between the stressors and the primary and secondary appraisals (Lazarus & Folkman, 1984). Student misbehavior has widely been considered the most influential for teachers (Dicke et al., 2014). Another way to consider this model is to think of stress as the outcome of the interaction between a stressor and an individuals' perception of control over that stressor. If an individual perceives low job control with high job demand, it will create a stressful situation. Individuals then appraise, cope, and experience this occupational stress (Goh et al., 2010).

In a school setting, this model can be framed as how teachers internalize their daily experiences. Interactions are appraised by teachers and internalized as stressful or positive. The majority of interactions a teacher will have on a typical day are with their students and their colleagues. This study sought to understand better the roles these relationships play. When considering teachers' relationships with students, it is vital to consider the reciprocal effects these connections have on teacher job satisfaction. If a student perceives a positive relationship with a teacher, they are more apt to display respectful behavior in the classroom (Goodman, 2009). This respectful behavior then contributes to teacher job satisfaction and can enhance the overall climate of the school (Hernández & Seem, 2004). If the goal of educational leaders is to retain effective teachers, we must better understand how the daily interactions teachers have with their students and colleagues impacts their satisfaction with their job.

In the following section, a review of the literature is presented.

LITERATURE REVIEW

Teacher job satisfaction has garnered a considerable amount of research over the past three decades (Aldridge & Fraser, 2015) and for a good reason. Job satisfaction is an area of interest in a multitude of fields, including education, business, and psychology. Employee job satisfaction can act as a gauge of the mental health of an organization, as well as provide a metric for comparison. While there is no generally agreed upon definition of job satisfaction (Brezicha et al., 2020), there are schools of thought surrounding motivation and its role in job satisfaction. These theories, combined with large international databases such as the Teaching and Learning International Survey (TALIS), allow researchers the opportunity to examine teacher job satisfaction in different ways.

Teacher Attrition

Since the early 1980s, there has been a looming teacher shortage. According to the U.S. Department of Education's Teacher Shortage Areas Nationwide Listing report (2019), there has been a teacher shortage of some capacity in every state since 1991. This persisting shortage has been predicted as Ingersoll (2001) explained that evidence suggests the possibility of severe shortages of qualified teachers in years to come. One piece of this

evidence is the decline in teacher preparation enrollments. According to the U.S. Department of Education Title II Data Collection (2019), teacher preparation program enrollments have fallen 35% nationwide in the last five years. In 2015, tens of thousands of teachers were hired on an emergency or temporary credentials to meet school needs (Sutcher et al., 2016). These emergency credentialing programs placed an increased burden on individuals who are not prepared to teach and undermines the quality of education for students, especially students in schools with the highest areas of need. Over one-third of issued credentials and permits in California went to teachers not fully prepared for their assignments (Darling-Hammond et al., 2016). As fewer teachers are entering the field, the rate of student enrollment continues to climb. Student enrollments are projected to grow by three million in the next decade, driven by immigration and higher birth rates (Sutcher et al., 2016).

Another issue facing education in the United States, beyond professionals choosing other fields besides teaching, is the alarming rate teachers are leaving the profession. About one-third of teacher attrition is due to retirement. Two-thirds of teachers leaving the field depart before retirement age, primarily because of dissatisfaction with certain aspects of their teaching conditions (Sutcher et al., 2016). Hiring and retaining qualified teachers continues to be a problematic task across the country. According to the U.S. Department of Education Teacher Follow-up Survey (2012-2013), 20% of teachers either moved schools or left the profession entirely. This high level of attrition is exacerbated in early career teachers. Chang (2009) found that 25% of teachers leave the field before their third year. Billingsley (2004) states that nearly half of teachers depart after five years. This attrition rate is considered high when comparing it to other fields and occupations (Ingersoll, 2001).

Teacher attrition is more problematic than simply not being able to fill classrooms (Darling-Hammond et al., 2016). Attrition can impose significant costs on schools (Sutcher et al., 2016), negatively affect student achievement (Ronfeldt et al., 2013), and perpetuate equity issues in historically hard-to-staff schools (Day & Hong, 2016). Student achievement is then undermined as a function of teacher inexperience, under preparation, and instability (Sutcher et al., 2016). Schools then suffer from diminished relationships, the expense of training new teachers, and a lack of institutional knowledge. Conversely, schools with more stable teacher populations have increased collaboration and promote teacher effectiveness (Jackson & Bruegmann, 2009).

Investigating teacher attrition might be one way in which school leaders can improve issues associated with staffing. A more specific investigation into teacher job satisfaction might yield more significant results considering factors such as family or personal issues and retirement are beyond a school's control. Addressing teacher job satisfaction may allow schools to retain effective teachers and attract new ones to the field. Ingersoll (2002) suggests that addressing a few critical aspects of the teaching position would lower turnover rates, decrease school staffing problems, and lead to increases in school performance. By identifying and promoting factors that enhance teacher job satisfaction, educational leaders and policymakers may be better able to address teacher turnover.

Teacher-Student Relationships

One component of teacher job satisfaction is teachers' relationships with students. Students' daily interactions with teachers are closely linked with teachers' personal and professional identities (Spilt et al., 2011). Relationships between students and teachers have long been thought to be critically important to children's academic, social, behavioral, and emotional development (McGrath & Van Bergen, 2015). In their cross-case analysis, Stronge Ward and Grant (2011) found that nothing is more critical to student achievement than the teacher. Hattie (2009) found that the quality and nature of the relationships students have with their teachers had a more substantial effect on their achievement results than socio-economic status or teacher professional development. Teacher-student relationships have also been mentioned as one of the core reasons teachers remain in their profession (O'Connor, 2008). Conversely, Skaalvik and Skaalvik (2011) found that student discipline and behavior were negatively related to job satisfaction.

Moving forward, research on teacher relationships is crucial because as teachers form strong relationships with students, the students feel cared about and more connected to the school. When the student feels more connected to the school, they often have higher levels of achievement. These higher levels of achievement promote teacher job satisfaction (Michaelowa, 2002; Thapa et al., 2013). Thus, giving teachers a more intrinsic reason to develop stronger relationships with their students.

Bonds with school members are vital for students from challenging backgrounds because supportive adults can help students learn strategies for overcoming adversity. If students know their teachers have confidence in them, their confidence will grow. "When students felt engaged, encouraged, and supported, they participated more fully and experienced success" (Shepard et al., 2012, p. 52). In turn, students that trust their teachers are more likely to be engaged and focused on their schoolwork and academic achievements.

Research on teacher-student relationships has found that these relationships are foundational in building trust, increasing student motivation, and engagement and improving student achievement (Bernstein-Yamashiro & Noam, 2013; Freiberg, 2014; Murray, 2014). Aldrup et al. (2018) found that relationships work reciprocally between students and teachers. In their study, Kudlats and Brown (2020) build beyond the concept of teacher-student relationships into one of the principal-student relationships. The authors identify the significant role that teacher-student relationships play for both parties and extend the priority of the relationship to effective school leadership. Though intriguing, their study omits a significant understanding of how relationships with students impact job satisfaction?

Teacher Job Satisfaction

The need to address the teacher shortage dates back to the 1980s. Retaining effective educators is critical due to their direct impact on student learning (Robinson et al., 2008).

Addressing growing concerns of academic inadequacy in the United States requires the retention of solid teachers and the recruitment of future educators. The demand to increase recruiting new teachers to the field stems from two competing issues: increasing student enrollments and an aging teacher workforce (Ingersoll, 2001). While there is nothing to be done for the increasing number of students coming into the schools, one way educational leaders have tried to increase the supply of qualified teachers has been through recruitment initiatives such as loan forgiveness, tuition reimbursement, alternative accreditation, and teacher residency models (Sutcher et al., 2016). Offering these initiatives has not been enough to address teacher turnover in the United States. Future initiatives need to develop sustainable change that can address why professionals are choosing not to enter the field of teaching and why those who did have left the classroom entirely.

The research on students and teachers offers several well-documented concepts that could prove pivotal to developing sustainable changes to recruit and retain teachers. First, teachers with higher levels of job satisfaction are more likely to remain in the profession (Ingersoll, 2001; Woods & Weasmer, 2004). Second, how teachers perceive their school climate can positively or negatively affect their job satisfaction (Collie et al., 2012; Johnson et al., 2011). Third, increased student achievement promotes teacher job satisfaction (Michaelowa, 2002; Thapa et al., 2013). Strong relationships with teachers can increase student achievement through the School Connectedness Theory (Wingspread, 2004). Therefore, relationships with teachers are beneficial for students emotionally and academically (Loukas et al., 2006).

Previous studies have looked at the factors associated with teacher job satisfaction, such as work-related stress (Skaalvik & Skaalvik, 2015), school climate (Aldridge & Fraser, 2015; Renzulli et al., 2011), Job Demands-Resource Theory (Collie, 2021), and school processes (Shen et al., 2012). However, subsequent research assessing other aspects of a school's climate, including, for instance, teacher relationships, quality, order, and discipline, is warranted (Loukas et al., 2006). Assessing teacher relationships from the teacher-level instead of the principal-level has understandably been noted as the most appropriate measure of teacher job satisfaction. Fan et al. (2011) found that the majority of variation in perceived school climate (over 80% in each category) was accounted for using data from the individual level. The relatively small influence of school-level variables compared with individual-level variables illustrates the weakness in previous research, which exclusively engaged with school-level data since the majority of variation in perceptions of student climate was unaccounted for due to the omission of individual-level variables.

To understand teacher-student relationships can influence teachers' job satisfaction, we must understand teachers' daily experiences and stressors. The transactional model of stress and coping (Lazarus & Folkman, 1984) can be used to do this. In this model, an individual's reaction to stress is guided by the interpretation of an external stressor that triggers an emotional response. The subject then evaluates the interpretations based on their relevance and goal congruency. An external stressor is related to the subject's goals or values and therefore triggers emotions. Incidents that are goal incongruent to the subject trigger

emotions such as anger or fear (Lazarus & Folkman, 1984). Repeated daily experiences of unpleasant emotions in response to stressors can result in negative changes in well-being. In contrast, repeated daily experiences of pleasant emotions can result in positive changes in well-being (Spilt et al., 2011).

This theory identifies the conceptual basis of the study. Teachers are exposed to stressors from a variety of sources, including students and colleagues. Teachers' daily interactions can be a continued source of pleasant or unpleasant emotions. By analyzing how the teachers perceive their relationships with their colleagues and students, we can understand if these stressors are ultimately positive or negative. The school can also be understood as an external stressor. The overall climate of the building could either produce positive emotions or negative stressors. Through examining these external stressors (colleagues and students), this study can gain a unique understanding of the influence they might have on teacher job satisfaction.

CONCEPTUAL FRAMEWORK

Using the transactional model of stress and coping (Lazarus & Folkman, 1984), we can identify the relationships staff have with students based on their type of transaction. This model identifies the conceptual basis of the study. Teachers' daily interactions can be a continued source of pleasant or unpleasant emotions. The overall climate of the building could either produce positive emotions or negative stressors. By examining the impact of these stressors, this study can gain a unique understanding of how specific relationships impact teacher job satisfaction.

Analyzing and interpreting the directionality of a relationship also can yield extremely valuable information. If, for example, teacher-student relationships do, in fact, positively influence teacher job satisfaction, then we can understand this interaction as one with low demand and high control, ultimately leading to alleviating teacher stress and an increase in job satisfaction.

This study was guided the research question: *to what extent do student-teacher relationships impact teacher job satisfaction?* The conceptual framework is presented in Figure 1.
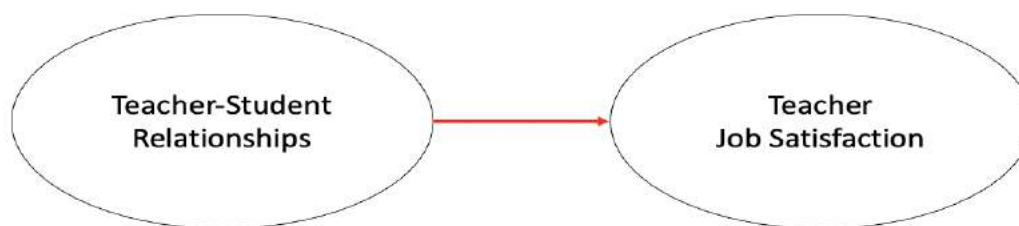
Figure 1 Conceptual Framework

METHODOLOGY

Data Source and Sample

The data for this study comes from the 2018 Teaching and Learning International Survey (TALIS). The TALIS 2018 data were collected by the Organization for Economic Cooperation and Development (OECD) from 34 participating countries. In each country, the OECD sampled about 200 schools and about 20 teachers in each school. TALIS 2018 followed the International Standard Classification of Education (ISCED 1997) to clarify the levels of education it examined: ISCED level 1 was primary education, ISCED level 2 was lower secondary education, and ISCED level 3 was upper secondary education. The target population for the main study of TALIS 2018 was ISCED level 2 teachers (e.g., middle school teachers in the United States). This study only analyzed responses from schools and teachers located in the United States for a sample of 2,560 lower secondary school teachers nested within 166 schools.

This data set was selected for two salient reasons. The first reason is that it contains appropriate measures of the key components of this study: teacher job satisfaction and teacher-student relationships. The second reason is its ability to examine a universal construct like job satisfaction from a representative pool of teachers. By using large-scale data, this study can act as a baseline for future comparative studies between countries or examine the impacts of differing policies. Zakariya (2020) identified several concerns with the development of the teacher job satisfaction scale. Based on this information, the researcher measured each construct individually to ensure appropriate measurement development.

Measures and Variables

Dependent Variable. Teacher job satisfaction was a construct that was formed into three scales by OECD, job satisfaction with the current work environment (T3JSENV), job satisfaction with the profession (T3JSPRO), and satisfaction with target class autonomy (T3SATAT). The first scale was used for this study as it is a more appropriate measure of teacher job satisfaction since it is more aligned to the research question. The construct

includes four items to examine the extent teacher-student relationships predicted teacher job satisfaction TT3G53C "I would like to change to another school if that were possible," TT3G53E "I enjoy working at this school," TT3G53G "I would recommend my school as a good place to work," and TT3G53J All in all, I am satisfied with my job". All items were measured on a four-point Likert scale, where the responses categories were: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. The reliability for the scale rendered an acceptable alpha reliability coefficient of Ω = 0.891 for the United States.

Independent Variables. The independent variable in this study is teacher-student relationships. The index of teacher-student relationships (T3STUD) was measured from the teacher perspective by a set of four items on a four-point Likert scale with response categories of "1 = never or almost never, 2 = a few times a year, 3 = a few times a month, and 4 = once a week or more." The survey items include statements about teachers' experiences with their students in their schools during the past twelve months TT3G49A "in this school, teachers and students usually get on well with each other," TT3G49B "most teachers in this school believe that the students' well-being is important," TT3G49C "most teachers in this school are interested in what students have to say," and TT3G49D "if a student from this school needs extra assistance, the school provides it." Higher scores for this variable indicate stronger positive levels of teacher and student relationships within a building. The reliability for the scale rendered an acceptable omega coefficient of Ω 0.848 for the United States 2.

Control Variables. For this study, participant gender, level of education, and teaching experience were controlled. Controlling for these variables allowed the researcher to analyze the amount of variance they account for compared to the predicting variables. Guided by relevant literature, these variables were selected specifically for their hypothesized impact on the outcome variables. For example, Guramatunhu-Mudiwa and Bolt (2012) found that teachers in North Carolina perceived that female principals outperformed their male counterparts in instructional and administrative roles. This difference in perception based on the gender of the teacher could then be controlled for as a background variable.

Statistical Analysis and Procedure

In this study, the complex measures and data structure determined the need for a sophisticated statistical analysis procedure. The research question inquired about the extent to which student-teacher relationships impacted teacher job satisfaction. Each topic was first operationalized as a latent construct. To do so, each scale needed to be generated and tested against the model fit indices previously mentioned. For each construct, the individual items were retrieved from the TALIS teacher data. Single-level confirmatory factor analysis (CFA) was utilized to construct teacher job satisfaction and teacher-student relations scales. Single-level multiple regression with latent variables while controlling for some teacher background information was performed. This controlling of covariates was done by

developing an initial model that did not include the focused predicting variable. The amount of variance the covariates accounted for was then recorded. In the next step of the analysis, the focused predicting variable was included, and the difference in the amount of variance accounted for in the model was calculated. The model diagram is presented in Figure 2. The bold path and arrow represent the focused effect, while the dash path and arrow represent the controlling effects of the background variables.
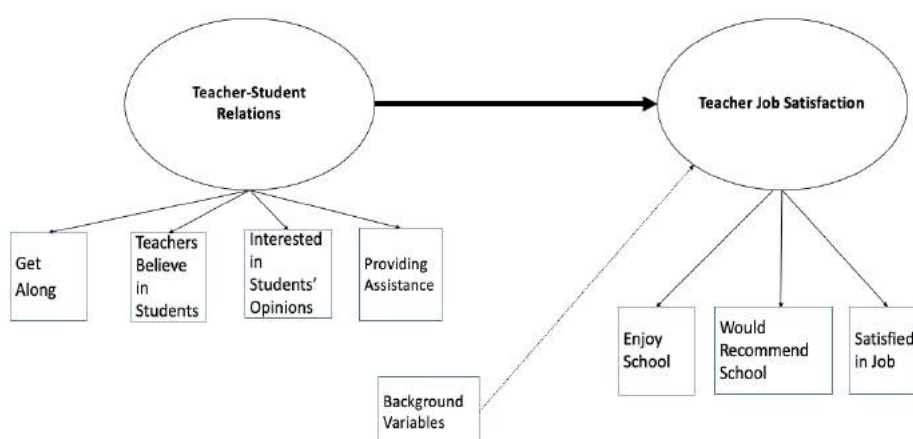
Figure 2. Model Diagram

Model Fit and Variance Explained

Multiple model fit indices were used to evaluate the fit between the proposed CFA models and the data. This attention to fit is vital as a model that poorly fits the data is not appropriate for interpretation and does not measure the constructs as accurately as possible. A poor model fit indicates that the model is influencing the data to allow for unsupported findings. This is significant to quantitative studies as the findings need to be interpreted only if they meet the model fit requirements. Otherwise, any model could be used to make any sort of claim without factual support. For example, in a study, the researcher could heavily influence the findings to make the results come out the way they intend. Utilizing model fit indices, lower-level model fit shows that the model suggested by the researcher is not a reasonable interpretation of what is going on in the data.

The following stand-alone fit indices and their acceptable values were utilized in this study: the comparative fit index (CFI; Bentler, 1990) and the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), both acceptable if above .90; and the root mean square error approximation (RMSEA; Browne & Cudeck, 1992) and the standardized root mean residual (SRMR), both acceptable if below .08. The chi-square statistic was also incorporated. Since the chi-square statistic is sensitive to large sample sizes, it was mainly used to compare competing models in this study. Since the maximum likelihood estimation with robust standard errors (MLR) estimation method was applied, I applied the scaled chi-square to

test the chi-square difference instead of using the chi-square from the Mplus output, as recommended by Muthen and Muthen (2017). Both the Akaike information criterion (AIC; Akaike, 1974) and the Bayesian information criterion (BIC; Schwarz, 1978) were used to compare competing models. Smaller AIC and BIC values indicate better model fit and model parsimony. Past the model fit, the amount of variance explained by each construct was analyzed. This information could allow for some idea about the effect size of relationships on teacher job satisfaction.

IBM SPSS 26 was used for the data preparation and used Mplus 8.0 for all data analysis. The MLR method was used to estimate the CFA and SEM models. This method ensured that the standard errors and model fit indices were corrected, addressed missing responses, and the results were robust to violation of data normality (Muthen & Muthen, 2017).

FINDINGS

The model fit for each of the constructs displayed sound psychometric properties teacher-student relations (CFI = .990, TLI = .969, RMSEA = .017, SRMR = .007), and teacher job satisfaction fit (CFI = .957, TLI = .939, RMSEA = .009, SRMR = .051). From there, a single-level regression was applied with latent variables. The first null model developed acted as a baseline and only included the outcome variable, job satisfaction, and the three covariates. This was done to ensure the further proposed models were, in fact, accurate measures of the data. This baseline model indicated that in total, the background variables accounted for about 7.5% of the total variance. These results are presented in Table 1.

Table 1 Estimated R-Squares Model

	Estimate	s.e.	p
Baseline Model	0.075	0.001	0.000
Complete Model	0.659	0.002	0.000

A full model was built to address the research question, including the key predictor of teacher-student relations. The model fit indices are presented in Table 2. The standardized regression results are presented in Table 3. A model diagram with standardized estimated effects is presented in Figure 3. The results showed that teacher-student relations (β = .526, p < .001), had statistically significant and positive effects on teacher job satisfaction. The model explained about 65.9% of the total variance in teacher job satisfaction. This means these relationships explained about 58.4% of the total variance in teacher job satisfaction. Among all four predictors, teacher-student relations presented the largest effect on teacher job satisfaction. The second-largest effect was teacher education (β = .025, p < .001). Teacher gender and experience also presented significant effects.

Table 2 Complete Model Fit Indices

χ^2	df	AIC	CFI	TLI	RMSEA
1382.265	37	97463.303	0.944	0.928	0.010

Table 3 Standardized Model Results

DV	IV	Estimate	s.e.	p
Teacher Job Satisfaction	Teacher Gender	0.019	0.002	0.002
	Teacher Education	0.025	0.002	0.000
	Teacher Experience	0.020	0.002	0.000
	Teacher-Student Relations	0.526	0.005	0.000
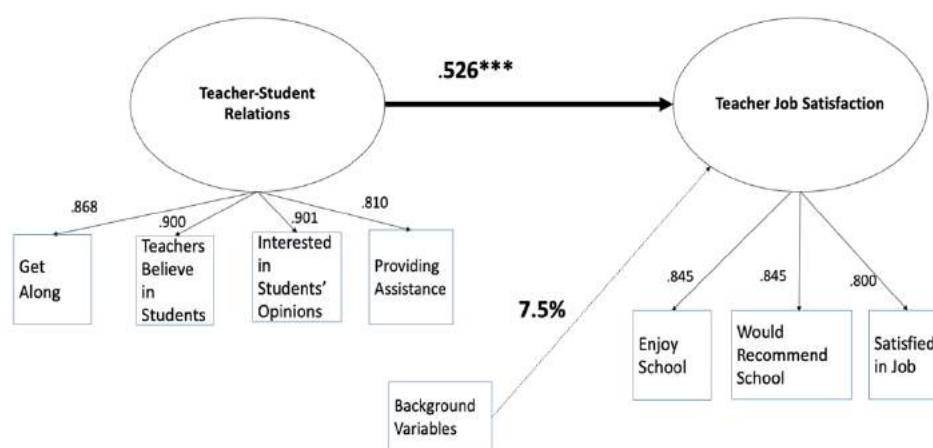
Figure 3. Model Diagram with Standardized Estimated Effects

CONCLUSIONS AND IMPLICATIONS

This study examined an issue that concerns the majority of educators in the field and academia. This study demonstrates the importance that relationships have on teacher job satisfaction. Based on the teacher sample from the TALIS (2018) survey, relationships have shown to be a significant predictor of teacher job satisfaction in the United States. The findings echo the work of Aldrup et al. (2018) and Lavy and Bocker (2018), who found that teacher-student relationships play a significant role in teacher well-being. The findings also answer their call for a more focused investigation of teacher-specific views. The results of this study come directly from teachers and demonstrate the benefits relationships offer from a transactional lens. A strong focus on relationships helps teachers cope with the other external stressors present in their school settings. Stressors such as school working conditions and workload, which have been found to influence teacher job satisfaction as

heavily as student behaviors (Toropova et al., 2021). The following paragraphs present the conclusions and implications for practice.

Relationships Matter

The research question that guided this study was focused on relationships between teachers and students. Practically, this finding is critical as it helps foster the conversation around the need for Social-Emotional Learning (SEL) and teacher self-care. These findings are consistent with previous research of O'Connor (2008) that outlines the importance of relationships for teachers to be satisfied in their jobs. The findings of this study complement previous studies' conclusions of the importance relationships can play (Ansari et al., 2020; Williford & Pianta, 2020), and affirm that teachers interpret relationships as low demand, high control stressor, and provide empirical evidence from a large-scale study.

As previously mentioned, the reciprocal nature of these relationships is imperative to note. When standardized tests seem to be valued above all else, educators need to understand that relationships with students are not "just another thing." We need to realize that the time we put into relationships with students is just as paramount to their success as it is to ours.

Implications

The implications of this study are intriguing due to their allowance for application. Understanding that relationships with students are an important factor that significantly impacts teacher job satisfaction can be utilized by students, teachers, administrators, policymakers, and anyone with a vested interest in education. Furthermore, school administrators should especially feel encouraged since the findings demonstrate that the factors that influence teacher job satisfaction heavily are ones in which they have some locus of control. It is difficult for an administrator to account for a teacher's age or level of education. However, administrators at all levels can understand that teachers are more satisfied with their jobs through enhanced relationships with students. If the goal of educational leaders is to retain effective educators, relationships need to be considered a significant factor.

From a development perspective, those tasked with developing principal preparation programs should strongly consider including aspects of teacher-student relationships in their course work and readings. Working with future leaders, we should consider relationship building as a central component in instructional leadership. Professional development time, community outreach initiatives all stem from developing and maintaining these fundamental relationships. These results, along with others (Veldman et al., 2013; Kudlats & Brown, 2020), can serve as a baseline for future studies to examine other ways in which relationships impact students, teachers, and principals.

LIMITATIONS AND RECOMONDATIONS

There are several limitations to this study. First, the data for this study is secondary in nature. The researcher did not develop the survey, nor was he involved in its deployment or initial analysis. Thus, the research methods are less flexible. The data was collected before the development of this study which means that the research questions posed must rely on the specific questions derived from the initial survey.

Second, job satisfaction is a complex and nuanced construct. This study sought to identify the extent to which one construct, teacher-student relationships, impacted teacher job satisfaction. Obviously, some other constructs and topics influence job satisfaction. This study demonstrates the first step in understanding how meaningful relationships are for educators. A more complex model could and should be developed to pinpoint the multiple components associated with teacher job satisfaction. This study, however, sought to examine one hypothesized to be fundamental closely.

A final limitation of the study is that it does not include student perceptions of their relationships with their teachers. Student data would allow the researcher to understand how they felt about their relationships and see if there is alignment between perceptions of students and teachers.

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Research

Music Students' Use of Mobile Applications for Learning Purposes

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Abstract:

This paper analyzes the use of mobile applications for learning purposes by music education department students. The survey design was used as the research method. The Mobile Application Usage in Music Learning scale developed by the researcher was used as a data collection tool. After the validity and reliability studies were carried out, the scale was applied to 505 music education students from 5 universities. As a result of the research: It was found that the mobile application usage levels of the music education students were moderate, mobile application usage levels changed according to gender but did not change according to grade level, musical instrument type, and operating system used. At the end of the research, suggestions were made about the participant groups, the use of the scale, and mobile applications.

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INTRODUCTION

Research on the use of mobile devices in education is increasing day by day. It can be said that mobile applications have a significant impact on the adoption and increase in the usage area of mobile devices. Mobile applications are mobile device-based software developed to assist users in performing certain tasks (Song & Kim, 2015). Music is one of the fields where experimental studies are conducted showing that mobile applications are an effective tool in the development of students' different musical abilities (Burton & Pearsall, 2016; Ng, Lui, & Kwok, 2015; Palazón & Giráldez, 2018). The focus of this study is to present the level at which future music educators use mobile applications, which have turned into a powerful learning tool.

With the addition of mobile devices to learning environments, it can be stated that physical limitations are eliminated and faster and more accessible learning environments are created. With mobile devices, it is possible to be included in the learning environment at any time and from any place. Pachler et al. (2010) stated that mobile devices will become the main tool in accessing information and self-expression, and therefore it would be beneficial to use them in educational environments. Herrington & Herrington (2007) emphasized that mobile technologies have the potential to change habits related to teaching-learning environments and provide the appropriate environment for authentic learning that requires high-level skills required by the 21st century. In the Unesco (2015) education report, it was reported that mobile technologies are the key to providing equal and quality service for everyone. Ventura (2017) stated that mobile technologies used by the teacher in a planned way are learning aids that allow the assimilated knowledge to be organized and integrated stably. Due to the stated benefits, since the beginning of the 2000s, interest in the use of mobile tools and technologies in education has increased in many countries and mobile learning has begun to be shown as the learning technology of the future (Çelik, 2013).

According to the 2018 ECAR mobile technology usage survey: laptops (94%), tablets (83%), and smartphones (53%) have a significant impact on higher education student achievement (Galanek, Gierdowski, & Brooks, 2018).

McQuiggan Kosturko et al. (2015) stated that mobile devices to be handled in the mobile learning environment should be portable, can be used on the go, content can be edited, and provide internet connection. Traxler (2010) states that it is not enough for the devices used in the concept of mobile learning to be just a mobile device or to be technologically advanced. He states that when determining the devices to be used, the systems, networks, and infrastructures that support them are as important as the devices themselves.

Many devices such as laptops, media players, gaming devices, cameras, audio recorders, tablets, smartphones are called mobile devices. Among all these devices, smartphones and tablet computers come to the fore, which have many features together.

Smartphones and tablets are distinguished from their competitors, such as hardware-powered laptops, with a significant difference. These devices can also be used on the go. For these reasons, it can be said that the use of smartphones and tablets in educational environments is more advantageous than other mobile devices.

Today's mobile devices have turned into devices that allow multi-purpose use with many advanced features. Features such as the expansion of their memories, the acceleration of internet connections, the increase in photo and video quality, the expansion of location features, the increase in both the number and quality of mobile applications can be shown as factors contributing to this transformation. With all these features, mobile learning tools can be easily incorporated into newer teaching approaches such as flipped classroom (Wong, 2016), blended learning (Borba et al., 2016), collaborative learning (Ilic, 2014), project-based learning (Chou et al., 2012), authentic learning (Burden & Kearney, 2016). Mobile learning has been used successfully in many fields such as language (Bayyurt et al., 2014), mathematics (Khoo, 2016), chemistry (Melo & Çomo, 2016), music (Debevc et al., 2020), history (Pegrum, 2019), physical education (Crawford & Fitzpatrick, 2015), and geography (Crompton, 2016). In addition, it is also useful in informal education areas by providing performance support (Cook & Santos, 2016; Dyson, 2014; Gu, 2016; Fahlman, 2014; Pimmer & Pachler, 2014). Mobile learning contributes positively to the motivation, creativity, comprehension, and comprehension levels of the learners (Kelekçi Olgun, 2018; Parsons, 2017; Steel, 2017).

In the literature, there are many studies in which mobile applications are used in music education. Birch (2017) examined the usability of the mobile application SoundCloud in music education. The study was conducted with 150 high school students. An institutional account has been opened and individual and collective recordings of music lessons have been uploaded to this account. Students were able to access these records whenever they wanted with their mobile devices. As a result of the research, it was determined that students' motivation, out-of-school learning activities, and self-confidence increased. Chen (2015) examined the effect of mobile application use on the development of aural skills. The research was conducted with 194 people using the Auralbook application. As a result of the study, it was concluded that the use of mobile applications contributed to motivation and musical skills. Chong (2019) examined the effect of the Harmonia-on-the-Go mobile application on students' music theory learning. The study was conducted with 37 high school students. As a result of the research, it was determined that the use of mobile applications contributed positively to the success and motivation of the students.

These studies show that mobile application support makes significant contributions to music learning. Participants in these studies used a mobile application for a specific purpose with the guidance of the researcher. So, do they have mobile application usage habits for learning purposes in their normal lives? Research to date has not yet determined the mobile application usage levels of music education students.

Today's music education students will take important roles in raising future musicians and music lovers. In higher education, it is aimed to bring students at the highest level that can meet the needs of society (MEB, 2018). In line with this purpose, it is aimed to train music teachers who are qualified and open to development in music education departments. Mobile learning (Özdamar Keskin, 2011), which is increasingly used and has become an interdisciplinary field, has the potential to be a powerful educational technology (Ekici, 2018). This study aims to examine the use of this potential by music education students.

Depending on the purpose of the research, the sub-problems to be answered are as follows:

1. What is the level of using mobile applications for learning purposes among the students of the music education department?
2. Do students' mobile application usage situations differ according to their gender, grade, musical instrument types, and the operating system they use?

METHOD

Research Model

A survey was used in this research. Büyüköztürk et al., (2016) define the survey model as follows: "research conducted on larger samples, generally compared to other studies, in which the views of participants on a subject or event or their interests, skills, abilities, attitudes, etc. are determined" (p. 177).

Participants

The study group consisted of undergraduate music education students of Gazi University, Marmara University, Uludağ University, Dokuz Eylül University, Necmettin Erbakan University in 2019-2020 academic year. The five oldest music education departments in Turkey, which were determined by the purposive sampling method, were included in the research. It was aimed to reach all enrolled students (YÖK, 2020). The distribution by universities is shown in Table 1.

Table 1

Distribution by Universities

University	N	%
Gazi	145	28,7
Marmara	105	20,8
Uludağ	89	17,6
Dokuz Eylül	90	17,8
Necmettin Erbakan	76	15,0
Total	505	100,0

Five hundred and five students participated in the study. The most participation was in Gazi University and the minimum participation was in Necmettin Erbakan University. Information on the number of students that can be reached is given in Table 2.

Table 2

Study Group

University	Enrolled	Reached	%
Gazi	236	145	61,4
Marmara	326	105	32,2
Uludağ	214	89	41,6
Dokuz Eylül	163	90	55,2
Necmettin Erbakan	189	76	40,2
Total	1128	505	44,8

As seen in the table, 1128 registered students were tried to be reached. Five hundred and five students who responded positively and participated in the research formed the study group. Approximately half of the targeted group has been reached.

Table 3

Demographic Information

		N	%
Gender	Female	271	53,7
	Male	234	46,3
Grade	1	124	24,6
	2	141	27,9
	3	134	26,5
	4	106	21,0
Musical Instrument Type	Turkish Music	127	25,1
	Western Music	378	74,9

In Table 3, information about 505 music students who responded positively and participated in the study is given. It can be said that a balanced distribution is realized, except for the musical instrument type.

This study, it was tried to examine the usage levels of mobile applications for learning purposes. In addition, the results were compared according to different variables. The explanation about the determined variables is presented below.

1. Musical Instrument Type: The music teaching undergraduate program in Turkey includes both Turkish and Western music lessons. So, does musical identity affect mobile application usage? For this, the mobile application usage levels of the students who play Turkish music and Western music instruments were compared.

2. Gender: Especially in technology-based research, the gender variable is questioned. It has been stated in many studies that males are more prone to technology. So, how is this situation in mobile application usage? For this reason, a comparison was made in the gender variable.

3. Operating System: Android and iOS are two operating systems that are widely used today. Both operating systems have their application markets. Do operating systems and the variety of applications they provide affect mobile application usage levels? In this context, usage levels were compared in the study according to the operating system variable.

4. Grade: Is the use of mobile applications for learning purposes acquired at the university or is it an individual situation? As the grade levels of the students increase, it is expected that their musical knowledge will increase. So, does this affect mobile application usage? For this reason, a comparison was made between grade levels.

Data Collection Tools

The Mobile Application Usage Scale in Music Learning was developed as a data collection tool in the research.

A literature review was conducted to determine the structural features and boundaries of the scale. First of all, it was tried to determine the types of mobile applications that can be used in music education. For this, literature (Demirtaş, 2019; Fulcher, 2017; Kell, Wanderley & Kit 2013; Khoury, 2017; Kocakaplan, 2018; Lehimler, 2019; Parasız, 2018; Webster & Williams, 2018) and mobile application markets, and music education undergraduate program were examined. There were 24 items in the draft form prepared.

Expert opinion was taken to ensure the content validity of the scale. Five of the seven experts work in music education, one in assessment and evaluation, and one in the Turkish language. After evaluations by experts, the number of items on the scale was reduced to 18.

The data collection tool consists of two parts. In the first part, there were eight factual questions to describe the demographic characteristics of the participants. In the second part, there were 18 items written in the form of behavioral statements. These items were created to determine the frequency of mobile application usage of the participants. The scale was

prepared in a five-point Likert (1932) type rating. The grading used in the scale is as follows: Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Always = 5.

The scale was applied in three different universities to determine the validity and reliability of the measurement tool. Information about the group in which the scale development study was conducted is given in Table 4.

Table 4

Scale Development Study Group

		N	%
University	Atatürk	73	36,1
	İnönü	57	28,2
	Muğla	72	35,6
Gender	Female	132	65,3
	Male	70	34,7
Grade	1	59	29,2
	2	66	32,7
	3	40	19,8
	4	37	18,3
Musical Instrument Type	Turkish Music	64	31,7
	Western Music	138	68,3
Total		202	100

As seen in Table 4, 202 music education students participated in the scale development study. It is recommended to reach ten times the number of items in scale development studies (Field, 2018, p. 1013; Kline, 1994, p. 74). For this reason, it can be said that the number of 202 participants reached for the 18-item scale is sufficient.

To determine whether the scale is suitable for factor analysis, the sample adequacy test Kaiser-Meyer Olkin (KMO) (Can, 2016, p. 319) and Bartlett's Test of Sphericity, which determines whether the distribution is normal or not (Tavşancıl, 2014, p. 51), were used.

According to the results of the analysis, the KMO value was found to be 0.88. Kaiser (1974, p. 35) states that this value should be higher than 0.50 (0.90 excellent, 0.80 good, 0.70 moderate). The data were normally distributed according to the Bartlett test of sphericity (x^2=1585,955, p=0.00). According to these findings, it can be said that the prepared scale is suitable for factor analysis.

Exploratory Factor Analysis (EFA) was performed to determine the construct validity of the scale. As a rotation technique, the Promax rotation technique, which is stated to offer the best solution for factor analysis (Hendrickson & White, 1964), was used.

When the item factor loads were examined, the 12th item (0.365-0.325), which gave loads on both factors, was removed from the scale.

Table 5

Total Variance Explained

		Initial Eigenvalues		Rotation Sums of Squared Loadings
Component	Total	% of Variance	Cumulative %	Total
1	6,179	36,349	36,349	4,491
2	2,368	13,927	50,276	3,942
3	1,165	6,852	57,129	4,057
4	1,036	6,097	63,226	3,446
5	,817	4,804	68,030	

When Table 5 is examined, it is seen that the items belonging to the scale are grouped under four factors with an eigenvalue greater than 1. These four factors explain most of the variance (63,226%) of the scale.

Factor results after Promax rotation are as follows: first factor six items (11, 14, 15, 16, 17, 18), second factor four items (1, 2, 3, 4), third factor four items (7, 8, 9, 10), and the fourth factor is three items (5, 6, 13). The load values of the items are as follows: the first factor is between 0.571-0.861, the second factor is between 0.627-0.869, the third factor is between 0.421-0.769, and the fourth factor is 0.634-0.818. Factor naming was done as follows: 1- Support apps, 2- Western music apps, 3- Creativity apps, 4- Turkish music apps.

The dimensions of the scale were revealed by factor analysis. Factor naming was tried to be done according to the characteristics of the items it contains. Explanations about the determined groups are given below.

1. Support Apps: Music listening and video watching applications, social sharing applications where musical developments can be followed, applications used to access music materials, voice recorder applications, metronome, tuner (Youtube, Spotify, Shazam, IMSLP, Facebook, Audio Recorder, Soundbrenner, Boss Tuner).
2. Western Music Apps: Applications based on Western music sound systems such as hearing, theory, virtual instruments (Better Ears, Mapping Tonal Harmony Pro, Piano, Guitar).
3. Creativity Apps: Sound recording and editing applications, notation applications (Garageband, iMPC, Korg Gadget, Mixfader).

4. Turkish Music Apps: Applications based on Turkish music sound systems such as hearing, theory, virtual instruments (Ahenk, Qanun, Nota Arsivi, Zurna).

Cronbach Alpha internal consistency coefficients were calculated to examine the internal consistency of the data collection tool revealed by EFA and to reveal the proof of reliability.

Table 6

Reliability Statistics

Factor	N of Items	Cronbach's Alpha
Support apps	6	,857
Western music apps	4	,838
Creativity apps	4	,756
Turkish music apps	3	,689

Cronbach Alpha values of the factors are given in Table 6. Özdamar (1999) states that "a value above 0.60 is quite reliable in the evaluation of the alpha coefficient" (as cited in Tavşancıl, 2014, p. 29), while Nunnally ve Bernstein (1994) state that "a value above 0.70 is sufficient" (p. 265). When the results of the analysis are examined, it is seen that the Turkish music apps (0.689) factor is very close to the value of 0.70, while all other factors are above the value of 0.70. Field (2018) states that the number of items affects the alpha coefficient (p. 1046). The fact that the number of items in the Turkish music apps factor is less than the others can be considered the reason for the coefficient difference. In the analysis of the overall scale, the Cronbach Alpha coefficient was found to be 0.888. According to the data obtained, it can be said that the scale is at a reliable level.

As a result of the analyzes made, it can be said that the Mobile Application Usage Scale in Music Learning is a valid and safe measurement tool consisting of 17 items.

Data Analysis

The prepared scale was applied online to 505 music education students after obtaining the necessary permissions. The collected data were entered into the SPSS 21 program. Since three erroneous data were detected in the control, analyzes were carried out with 502 data.

It was examined whether the data were normally distributed or not to determine which types of statistical tests would be performed. For this, it was checked whether the skewness and kurtosis coefficients were in the expected (±1) value range for the normal distribution (George & Mallery, 2019, p. 115), and Shapiro-Wilk, Kolmogorov-Smirnov normality tests were applied.

Table 7

Determined Statistical Tests

	Gender	Grade	Musical Instrument Type	Operating System
Western music apps	Mann-Whitney U	Kruskal-Wallis	Mann-Whitney U	Mann-Whitney U
Turkish music apps	Mann-Whitney U	Kruskal-Wallis	Mann-Whitney U	Mann-Whitney U
Creativity apps	Mann-Whitney U	Kruskal-Wallis	Mann-Whitney U	Mann-Whitney U
Support apps	Mann-Whitney U	Kruskal-Wallis	Mann-Whitney U	Mann-Whitney U
General	Mann-Whitney U	ANOVA	t	t

Statistical tests determined according to each variable are given in Table 7. In the application of parametric tests, there is a prerequisite that the data show normal distribution (Morgan et al., 2011). For this reason, testing the difference between the scores of the two groups was examined with the Mann-Whitney U test for data that did not show normal distribution (George & Mallery, 2019, p. 373) and with the Independent Samples t-Test for those with a normal distribution (Can, 2016, p. 115). Testing the difference between the scores of more than two groups was examined with the Kruskal-Wallis test for data that do not show normal distribution (Bryman & Cramer, 2005, p. 169), and with One-Way ANOVA for those with a normal distribution (George & Mallery, 2019, p.371).

Although the Mann-Whitney U test reveals the difference between the means, it does not calculate the magnitude of this difference. For this reason, the effect size was also calculated. The effect size (r) is calculated by dividing the z value resulting from the test by the square root of the sample number (Field, 2018, p. 403). The calculated effect size was interpreted according to the criteria of 0.10 low, 0.30 medium, 0.50 high (Field, 2018, p. 179).

Ethical Permissions

This study was approved by the Gazi University.

Ethical review board name: Gazi University Ethics Committee

Date of ethics review decision: 26.08.2019

Ethics assessment document issue number: 91610558-302.08.01

RESULTS

The first sub-problem of the research is as follows: What is the level of using mobile applications for learning purposes among the students of the music education department?

Table 8

Scale Scores

Factor	N	Minimum	Maximum	$\bar{x}$	SD
Western music apps	502	1,00	5,00	3,32	,91
Turkish music apps	502	1,00	5,00	2,43	,83
Creativity apps	502	1,00	5,00	3,21	,95
Support apps	502	2,33	5,00	4,27	,56
General	502	1,65	5,00	3,31	,60

Table 7 presents the results obtained from the scale of mobile application use in music learning. The overall score average was calculated as 3,31. Accordingly, it can be said that the mobile application usage frequency of music education students is at a moderate level.

The average score of the Western music apps factor was measured as moderate (3,32). According to the factor results, students generally use mobile applications while doing solfeggio exercises (3,65); and occasionally use mobile applications during theory (3,20), hearing (3,30), and singing studies (3,15).

The average score of the Turkish music apps factor was measured as moderate (2,43). According to the factor results, students occasionally use mobile applications while doing Turkish music song exercises (2,62); and rarely use mobile applications during aural (2,25) and maqams (2,41) studies.

The mean score of the creativity apps factor was measured as moderate (3,21). According to the factor results, students generally use mobile applications while playing the instrument (3,45) and when they need accompaniment (3,41); They occasionally use mobile applications while writing notes (2,90), composing, and arranging (3,08).

The mean score of the support apps factor was measured to be high (4,27). According to the factor results, students generally use mobile applications when they need metronome (4,11); They always use mobile applications to listen to music (4,34), use a tuner (4,26), record (4,33), access music materials (4,22), follow musical developments (4,33).

The second sub-problem of the research is as follows: Do students' mobile application usage situations differ according to their gender, grade, musical instrument types, and the operating system they use? The results of the Mann-Whitney U test for the gender variable are given in Table 9.

Table 9

Mann-Whitney U Test for the Gender

	Group	N	Mean Rank	Sum of Ranks	$\bar{x}$	p
Western music apps	Female	268	274,26	73503,00	3,45	,00
	Male	234	225,43	52750,00	3,16	
Turkish music apps	Female	268	252,32	67622,50	2,42	,89
	Male	234	250,56	58630,50	2,43	
Creativity apps	Female	268	261,61	70112,00	3,26	,09
	Male	234	239,92	56141,00	3,15	
Support apps	Female	268	264,19	70804,00	4,30	,03
	Male	234	236,96	55449,00	4,22	
General	Female	268	267,38	71658,50	3,36	,00
	Male	234	233,31	54594,50	3,24	

As seen in Table 9, there is no significant difference in Turkish music apps and creativity apps factors according to gender (p>0.05). A significant difference was found between the means for Western music apps and support apps (p<0.05). A statistically significant difference was observed between the scores of female students (3.36) and the scores of male students (3.24) when looking at the scale in general. The effect size calculated as a result of the test (r=0.11) shows that this difference is low. According to the results of the analysis, it can be said that female students use mobile applications more frequently for educational purposes than male students. The Kruskal-Wallis test analysis results for grade level are given in Table 10.

Table 10

Kruskal-Wallis Test Analysis of Grade Variable for Factors

Factor	Grade	N	Mean Rank	df	X²	p
Western music apps	1	121	270,80	3	3,43	,33
	2	141	252,44			
	3	134	243,16			
	4	106	238,76			
Turkish music apps	1	121	255,40	3	7,08	,06
	2	141	230,81			
	3	134	275,72			
	4	106	243,95			
Creativity apps	1	121	277,83	3	6,40	,09
	2	141	245,38			
	3	134	250,34			
	4	106	231,04			
Support apps	1	121	261,82	3	5,97	,11
	2	141	266,88			
	3	134	247,11			
	4	106	224,82			

As can be seen in Table 10, the frequency of students' use of mobile applications does not differ significantly based on factors according to their grade levels (p>0.05). The results of the one-way ANOVA analysis of the overall scale are given in Table 11.

Table 11

One-Way ANOVA Test Analysis of Grade Variable by Overall Score

	Sum of Squares	df	Mean Square	F	p
Between Groups	2,146	3	,715		
Within Groups	179,947	498	,361	1,98	**.116**
Total	182,093	501			

It is seen in Table 11 that students' mobile application usage status does not show a significant difference according to their grade levels in general [$F_{(3-498)}$=1,98, p>0.05]. Accordingly, it can be said that the grade level does not have a significant effect on the use of mobile applications in music learning.

Table 12

Mann-Whitney U Test Results of the Variable of Musical Instrument Type by Factors

	Group	N	Mean Rank	Sum of Ranks	$\bar{x}$	p
Western music apps	Turkish Music	127	237,11	30113,50	3,22	,19
	Western Music	375	256,37	96139,50	3,35	
Turkish music apps	Turkish Music	127	283,09	35953,00	2,61	,00
	Western Music	375	240,80	90300,00	2,36	
Creativity apps	Turkish Music	127	244,93	31106,50	3,16	,55
	Western Music	375	253,72	95146,50	3,22	
Support apps	Turkish Music	127	249,42	31676,00	4,24	,85
	Western Music	375	252,21	94577,00	4,27	

Table 12 shows that students' mobile application usage status differs significantly in the Turkish music apps factor (p<0.05). No significant difference was found in other factors (p>0.05). It can be said that students who play Turkish music instruments use Turkish music apps more often than students who play western music instruments. Independent samples t-test results of the scale are given in Table 13.

Table 13

Independent Samples T-Test Results of the Variable of Musical Instrument Type by Overall Score

Group	N	$\bar{x}$	Sd	df	t	p
Turkish Music	127	3,31	,67	500	,104	**,918**
Western Music	375	3,30	,57			

It is seen in Table 13 that students' mobile application usage status does not show a significant difference according to their musical instrument type in general. It can be said that the musical instrument type does not have a significant effect on the use of mobile applications in music learning.

Table 14

Mann-Whitney U Test Results of the Variable of Operating System by Factors

	Group	N	Mean Rank	Sum of Ranks	$\bar{x}$	p
Western music apps	Android	314	249,32	78288,00	3,30	,66
	iOS	188	255,13	47965,00	3,34	
Turkish music apps	Android	314	244,29	76707,50	2,39	,14
	iOS	188	263,54	49545,50	2,47	
Creativity apps	Android	314	252,65	79331,50	3,23	,81
	iOS	188	249,58	46921,50	3,17	
Support apps	Android	314	243,10	76333,00	4,23	,09
	iOS	188	265,53	49920,00	4,32	

Table 14 shows that students' mobile application usage does not differ based on factors according to the operating system they use (p>0.05). Independent samples t-test results of the scale are given in Table 15.

Table 15

Independent Samples T-Test Results of the Variable of Operating System by Overall Score

Group	N	$\bar{x}$	Sd	df	t	p
Android	314	3,29	,61	500	-,666	**,506**
iOS	188	3,33	,58			

Table 15 shows that there is no significant difference between the mean score of students using Android and iOS users (p>0.05). In this case, it can be said that the operating system used does not have a significant effect on the frequency of mobile application usage.

CONCLUSION AND DISCUSSION

For the first sub-problem of the research, the mobile application usage levels of the music education department students were examined. According to the data collected from 502 participants with the Mobile Application Usage Scale in Music Learning; Music education students' use of mobile applications related to their learning is at a moderate level ($\bar{x}$=3,31). Similarly, Bannerman & O'Leary (2020) found that music education students', Bauer ve Dammers (2016) found that music teachers' frequency of using the software was moderate. The highest level of usage was in the support apps factor ($\bar{x}$=4,27). According to the items in this factor, music students; use mobile applications intensively when they need to listen to music, need a metronome and tuner, take audio or visual recordings, access music materials, and follow musical developments. The lowest level of usage was observed in the Turkish music apps factor ($\bar{x}$=2,43). Music education students stated that while they occasionally use mobile applications while studying Turkish music songs, they rarely use mobile apps for Turkish music aural studies. A moderate level of participation was also observed in Western music apps and creativity apps factors. While students are studying solfeggio and instruments, and when they need accompaniment, they generally use mobile applications; They stated that they occasionally use mobile applications for notation writing, western music theory, hearing, singing, and composition-arranging.

Lehimler (2019) concluded that awareness of applications such as listening to music, writing notes, tuners, and metronome is high. On the other hand, he concluded that awareness of the applications developed for instrument training, singing, music theory, and hearing training is at a low level. He concluded that the music teacher candidates have less idea about the software developed especially for musical performance. Gorgoretti, (2019) stated that music education students use notation and music creation software as well as social networks and music listening applications intensively. Haning (2015) found that music education students frequently use notation and music creation software. Ayhan ve Ertekin (2017) stated that music students are very interested in technological materials prepared for solfeggio studies. Gilbert (2015) determined that music teachers find technology support useful for instrument studies and they frequently use software developed for accompaniment and recording. Gaines (2018) found that music students in higher education frequently benefit from technology for learning, discovery, and performance purposes, and they especially use accompaniment, music production, and recording software. Fulcher (2017) stated that music students frequently use social networking applications and music listening applications for musical sharing and learning purposes. Upitis et al., (2016) determined that music teachers found the use of mobile devices for educational purposes more usable than computers, and the most frequently used listening, recording, and metronome software intensively.

When the results given above are compared with the data obtained in this study, the results of listening to music, virtual instrument, accompaniment, recording, metronome,

and tuner use are similar. On the other hand, especially notation software differs. In many studies, it has been stated that notation software is the most used software. In these studies, music software has been examined in general without making any distinction between mobile devices and computers. It can be said that the use of notation software on computers has some advantages over mobile devices. Computers provide more comfortable use for notation software than mobile devices in terms of screen size and keyboard usage. It can be said that the reason for the difference is due to this situation. When the application markets are examined, it can be seen that the number of mobile applications related to notation is less than other application types (Kell & Wanderley, 2014).

When we look at the music teaching curriculum in Turkey, it is seen that Turkish music lessons are at the same rate as Western music lessons. While the students in this department make use of mobile applications while doing studies such as western music hearing and theory, they use fewer mobile applications in studies related to Turkish music. The main reason for the lower frequency of use of Turkish music applications compared to other application groups may be that the variety of applications produced specifically for this field is quite low.

For the second sub-problem, mobile apps usage frequencies were compared according to gender, grade, musical instrument type, and operating system. As a result of the analysis, a significant difference was found in favor of women. According to the analysis made based on factors, there is no difference in the factors of Turkish music apps and creativity apps, a significant difference was found in favor of female in the factors of western music and support apps.

When we look at the literature, it can be said that although there are studies in which gender does not affect technology use (Raman et al., 2014; Salentiny, 2012), there are many studies in which men's technology use, attitude, and acceptance levels are higher (Ardies et al., 2015; Liaw & Huang, 2011; Milis et al., 2008; Okazaki & Santos, 2012). Similarly, men's self-efficacy in the use of music technologies related to their education (Doherty, 2018) and their experience in music technologies (Bannerman & O'Leary, 2020) were found to be higher than women's. Despite this situation, research results on mobile technologies differ. In many studies, it was emphasized that the use of mobile applications did not change according to gender (Hilao & Wichadee, 2017; Huseynov, 2020; Kamiyama et al., 2016; Lehimler, 2019; Wai et al., 2018) and in some studies, results in favor of women were obtained (Hwang et al., 2016; Kim et al., 2015). In this study, the frequency of using mobile applications for educational purposes among women was higher than that of men. From this point of view, it can be said that with the increasing use of mobile devices and applications, the difference in gender variables decreases.

In the examination made according to the grade level variable, no difference was found between the grade level of the music education students and the frequency of mobile apps usage. Similarly, Prieto et al. (2016) concluded that the class variable did not affect

mobile application usage. Considering the age factor, van der Kaay & Young (2012) concluded that younger people are more interested in technology use. When the mobile apps download and usage rates are examined, it is seen that while the age level increases, the usage rate decreases (Shah, 2020). The close age of the undergraduate students who make up the study group of this research can be seen as the reason for the lack of difference in mobile apps usage levels. According to this result, it can be said that the education given at the university does not affect the students' use of mobile applications for learning purposes. Students have gained this habit individually.

In the analysis made according to the musical instrument type variable, it was found that the mobile application usage of the music education students differed only in the Turkish music apps factor. It was determined that students who play Turkish music instruments use mobile apps more intensively in cases related to Turkish music. It has been concluded that the musical instrument type does not affect the use of mobile apps according to western music apps, creativity apps and support apps, and the scale in general.

No significant difference was found in the examination made according to the operating system. It can be said that the use of Android or iOS operating system has no effect on the use of mobile apps in music learning. Chmielarz (2020) stated that iOS users use their smartphones more functionally than Android users. Differently, Pryss et al. (2020) concluded that the use of mobile apps did not change according to the operating system used. At this point, it can be said that the prominent factor is the variety of mobile apps. The application markets of both operating systems contain similar mobile apps that will meet the application use cases created within the scope of this research. The presence of mobile apps that meet similar features on both platforms can be seen as the reason why mobile apps usage is similar.

The results of this study showed that students who play Turkish music-Western music instruments, those who are new to music education and about to graduate, and students who use different operating systems benefit from mobile applications at a similar level. In addition, it was observed that technology usage habits changed according to gender. The importance of mobile technologies in human life is increasing day by day. Mobile technologies that attract the same attention of different groups can be seen as a unifying factor. This unifying power can be used positively in music education as in many other fields.

LIMITATIONS AND RECOMONDATIONS

The study group of the research was formed only from students of the music education department. The result of this study does not include students who continue their education in other fields of music. The use of mobile apps in music learning can be examined

in different studies with other music students, teachers, amateur and professional musicians.

The data collection process of the research took place in the 2019-2020 academic year. The pandemic process that emerged after this process may have caused differences in the use of mobile applications. It is recommended to conduct studies examining the pandemic process and after.

The scale used in the study was developed only with music education students. It is recommended to test the validity of the scale on different groups. In addition, only exploratory factor analysis was applied during the scale development process. It is also recommended to perform confirmatory factor analysis in different studies.

One of the findings of the research is that the use of mobile applications related to Turkish music has the lowest rate. For this reason, it is recommended to develop mobile applications related to Turkish music.

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Data Collection Tool

Geleceğin müzik öğretmeni,

Mobil uygulamalar, akıllı telefon, tablet bilgisayar gibi mobil cihazlar için hazırlanmış yazılımlardır. Bu çalışma, müzik öğrenimi gören bireylerin, mobil uygulamaları kullanma düzeylerini belirleyebilmek için hazırlanmıştır. Vereceğiniz cevaplar bilimsel bir araştırma verisi olarak kullanılacağından, tüm soruları içtenlikle cevaplamanız, araştırmanın sağlıklı olarak tamamlanması için önemlidir. Her sorunun size en uygun tek bir cevabına (x) işareti koyunuz. Cevaplar araştırmanın amaçları dışında kullanılmayacaktır. Lütfen boş bırakmayınız.

Katkılarınız için teşekkür ederim.

Erkan DEMİRTAŞ

Cinsiyetiniz	☐ Kadın ☐ Erkek
Sınıfınız	☐ 1 ☐ 2 ☐ 3 ☐ 4
Bireysel çalgı alan türünüz	☐ Türk Müziği ☐ Batı Müziği
Akıllı telefonunuzun işletim sistemi	☐ Android ☐ IOS ☐ Windows ☐ Akıllı telefonum yok
Tablet bilgisayarınızın işletim sistemi	☐ Android ☐ IOS ☐ Windows ☐ Tablet bilgisayarım yok
Sürekli internet bağlantısına sahip misiniz?	☐ Evet ☐ Hayır
Mobil müzik uygulamaları ile ilgili eğitim almak ister misiniz?	☐ Evet ☐ Hayır
Mobil uygulama geliştirme ile ilgili eğitim almak ister misiniz?	☐ Evet ☐ Hayır

➡

Aşağıdaki durumlara ait **mobil uygulama** kullanma sıklığınızı belirtiniz	Her Zaman	Çoğunlukla	Ara Sıra	Nadiren	Hiçbir Zaman
1 Solfej çalışırken (ses alma, kontrol etme vb.)					
2 Batı müziği teorisi çalışırken					
3 Duyma (aralık, dizi, akor vb.) çalışmaları yaparken					
4 Şan çalışmaları yaparken					
5 Türk müziğine yönelik işitme çalışmaları yaparken					
6 Türk müziği eserlerini çalışırken					
7 Enstrüman çalışırken					
8 Nota yazmam gerektiğinde					
9 Eşlik ihtiyacım olduğunda					
10 Beste, aranje, düzenleme gibi çalışmalar yaparken					
11 Bir eseri dinlemem gerektiğinde					
12 Türk müziği dizi ve makamlarına çalışırken					
13 Metronom kullanmaya ihtiyaç duyduğumda					
14 Akort cihazı kullanmaya ihtiyaç duyduğumda					
15 Sesli/görsel/yazılı kayıt almam gerektiğinde					
16 Müzik materyallerine (nota vb.) ulaşmak için					
17 Müzikal gelişmeleri takip etmek için					

TEŞEKKÜRLER

PERSISTENCE AND ACADEMIC PERFORMANCE OF MEDICAL STUDENTS IN ONLINE LEARNING ENVIRONMENT DURING THE COVID-19 PANDEMIC LOCKDOWN

Mohsin M Syed [1]   Noor Akhter [2]   Mohamed Mostafa Ibrahim [3] Laura C Stanley [4]

Abstract:

Government response to the COVID 19 pandemic in the spring of 2020 came as a wave of physical closures requiring sudden change in the method of instruction from face-to-face to a completely online. Assessment of student's adaptation to this change during emergency lockdown is the focus of this study. Students' test scores related to perception of persistence levels were studied using correlation analysis. In addition, a regression analysis was performed to examine prediction factors of medical student grades during COVID-19. Students' grades in the module during COVID-19 were significantly higher compared to the grades in recent prior years at the p<.001 level [F (3, 692) = 9.08]. Pearson product-moment correlation results showed a strong and positive correlation between students' persistence level (M = 3.46, SD = .997, n = 79), and their module grade during COVID-19 (M = 258.777, SD = 14.6878, n = 79), r = .33, p = < .01. The multiple linear regression analysis accounts for 14% of the variance in students' module grades and the variance was statistically significant at p < .05. As such, we conclude that students' persistence to adjust to a new learning environment, coupled with module directors and faculty successfully employing remote education methods, met the learning challenges during the pandemic and students maintained a high level of academic success.

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INTRODUCTION

Spring semester 2020 will always be remembered as the semester of academic interruption caused by the COVID-19 Pandemic. In mid-March 2020, the University of Arkansas for Medical Sciences (UAMS) cancelled face-to-face classes and moved instruction completely online in response to mandatory lockdown for the safety of students, faculty, and staff. Medical education methods required emergency adaptation due to mandatory lockdown, providing an impetus for pedagogical innovations (Dedeilia et al., 2020). Lockdown began the first day of the Brain and Behavior Module and changed every aspect of the normal learning environment for instructors and students alike.

The pedagogical transformation of medical school curricula including changes in student contact hours, classroom technologies, laboratories, and implementation of active self-directed learning had been a trend for several years (Irby et al., 2010; Rose, 2020) with UAMS being no exception. The pandemic hastened this transformation, but created hitherto unaddressed problems, including how to adapt laboratory and clinical hands-on activities using cadaveric laboratory material, standardized patients, team collaboration, and student-instructor interaction in-person. Other difficulties included unequal access to remote technology, unreliability of rural internet bandwidth, variable home environments, stress of potential of illness, and variation in students' learning styles.

Possible effects on students' ability to adapt to necessary sudden changes in instructional methods used in the 2020 UAMS brain and behavior module during lockdown became the impetus for this study. Social Cognitive Theory (SCT) was used to look for factors affecting the academic performance of medical students in the sudden academic interruption.

Many studies indicated that teaching online requires different pedagogy and students are required to self-regulate their learning to successfully complete online courses (Moore et al., 2011; Rovai & Downey, 2010; Schroeder & Levin, 2012). Despite presumed flexibility, an online learning environment requires students to choose their learning time and pace, and many students often struggle to effectively regulate their learning process (Azevedo, 2005; Bol & Garner, 2011). Self-regulated learning is very crucial for students' learning because it enables students to initiate and direct their own efforts to acquire knowledge and to be actively involved in learning.

Researchers classified self-regulation strategies into three broad and overlapped areas: personal, behavioral, and environmental (e.g., Delen & Liew, 2016; Pintrich, 1999; Wang et al., 2009; Wolters & Rosenthal, 2000; Zimmerman, 1989). Personal traits in students such as persistence, self-control, or the capacity to regulate attention, emotion, and behavior in the presence of challenges have been highlighted as important for student success (Davis, 2015; Duckworth & Gross, 2014; Tough, 2012). Specifically, many scholars have postulated the importance of students' persistence to their academic outcomes and successful degree completion (Duckworth et al., 2011; Duckworth & Quinn, 2009; Rojas et al., 2012).

The significance for this study is grounded on its novel assessment of medical student academic performance during emergency as well as the contribution to an already large body of research investigating the advantages and disadvantages of online teaching strategies in different contexts. After examining prior research, the following research questions will guide this study:

1. Is there a relationship between students' module grades and their persistence level in an online learning environment during COVID-19 academic interruption?
2. What factors best predict the module grades of medical students during COVID-19 academic interruption?
3. Do medical students' grades during the COVID-19 academic interruption differ compared to students' grades prior to COVID-19?

METHOD

Theoretical framework

The present study adopted a theoretical framework founded on Bandura's Social Cognitive Theory (SCT) to examine the different influence of three factors in students' learning (personal, behavioral and environmental) (Bandura, 1986, 1997). Bandura suggested that these three factors can contribute to enhancing learners' self-efficacy through attending the consequences of their learning activities. Bandura defined self-efficacy as "the beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997). According to Bandura (1997), people would make their choices based on their self-efficacy beliefs and these beliefs are not about the number of skills they possess but what they can accomplish with those skills under different situations. Additionally, people's self-efficacy beliefs impact their efforts to complete their tasks and their resolve to cope with difficult situations. According to Bandura (2001), learning can be acquired by engaging students in setting goals for themselves then directing their action accordingly. Thus, in the context of the present study, there are three factors contributing to students' learning that can be observed through the following actions: behavioral (participation in online activities); cognitive (process of learning); and environmental (course materials). According to SCT, students taking an active role in the process of learning are expected to change their learning strategies leading to mastering the learning content. Figure 1 Presents the theoretical framework model based on Bandura's Social Cognitive Theory.
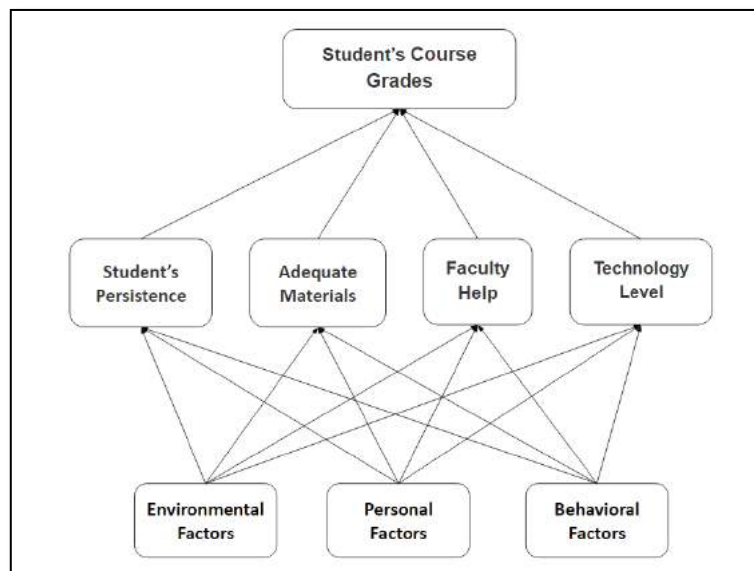
Figure 1. Theoretical framework based on Bandura's Social Cognitive Theory

Research Design

The present study used the social cognitive theory framework to examine factors affecting the academic performance of medical students as they adapted to the fully online learning environments during the COVID-19 academic interruption. Correlation analysis was used to examine the relationship between students' test scores and their persistence level during COVID-19. This study explored factors that best predict course grades for medical students during the pandemic. A comparison design was used between students' academic performance in two different conditions (during and before COVID-19).

The present study adopted Bandura's Social Cognitive Theory (SCT) as a theoretical framework to examine the interplay between three factors in students' learning (personal, behavioral and environmental) (Bandura, 1986). According to SCT, students immersed in their learning activities and taking an active role in the process of learning are expected to change their learning strategies, leading to mastering the learning content. The investigators of this study have employed a between-subject design. The study included one dependent variable (students' grades in the module) and five independent variables (comfort level of online learning, comfort level of using technology, faculty help, online learning materials, and student perception of their persistence levels during COVID-19).

Module Description:

The Brain and Behavior Module originated through combination of interdisciplinary neuroscience course and a behavioral science course. It covers a broad range of topics focusing primarily on neurology, neuropathology, and psychiatry.

Module Learning Assessments:

The investigators used students' exam scores to evaluate them. A total of 90 seconds per each exam question was allotted both prior to and during the pandemic. To accommodate environmental challenges in the remote situation, students had an extended timeframe for starting the exam remotely but not for completing the exam questions.

Sampling and Participants:

In this study, the investigators utilized the convenience sampling technique to recruit the participants. Voluntary participation of students was solicited online via electronic mail. Participats in this study were 79 students enrolled in College of Medicine M1. Participants included 30 male, 45 female and 4 preferred not to answer. There were 56 students aged between 22-24, 14 students age between 25-28 and 9 students aged 29 and above. There were 56 White students, 5 Hispanic/Latino students, 1 Black/African American student, 5 Native American or Alaska Native students, and 12 Asian students.

Data Collection and IRB:

Approval from the university's institutional review board (IRB) was obtained before data was collected. The investigators de-identified the collected data to afford student anonymity. After data collection via the online survey instrument, the records were housed on the university's secure server.

Measures and Instrument:

Prior to the development of the research instrument, a literature review of online learning was conducted. Faculty members in the College of Medicine reviewed the instrument. The

instrumentation consisted of the following: students' demographics, a twenty-question survey with 5-level Likert scale for assessment of student perception of persistence levels during the academic interruption caused by COVID-19, student use of module learning materials, and the level of student satisfaction with help received during online learning.

Survey of student perception of online learning:

This survey allowed assessment of students' perception of persistence levels and overall experience in the emergency online learning setting. All items in this questionnaire were adapted from published works and were discussed with academic scholars to ensure construct validity prior to conducting the study. To improve clarity, comprehensiveness, and relevance of this instrument, as well as to check for content validity, college students in different courses took this survey and instructors' inputs were applied. The investigators then formulated the questionnaire to included six items concerning students' perception of their experience with the online learning in the College of Medicine. These six items addressed four concepts: 1) perceived positive and negative online experiences, 2) satisfaction with online learning content, 3) satisfaction with the help provided by faculty, and 4) perception of persistence levels during COVID-19 interruption.

Example question of student perception of online learning:

Each respondent was asked to rate the following statement: "I have never been excited about the online learning". Students had the choice to select one of the following answers: 5 = Strongly Agree, 4 = Agree, 3 = neither Agree nor Disagree, 2 = Disagree, 1 = Strongly Disagree.

Survey of students' perception of academic impact:

This survey used a Likert-scale questionnaire to assess students' perceptions of the academic impact of Covid19 and student adaptation to a fully online format. Students were asked to voluntarily participate in this 29-question survey at the end of the semester.

Example question asked in the students' perception of academic impact survey:

Sudden change in teaching was stressful at first but improved as the module continued. Students taking the survey have the choice to indicate their agreement or disagreement with this statement with answers on a scale between 5 (Strongly Agree) to 1 (Strongly Disagree).

Ethical Considerations

All procedures performed in the current study were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments and the comparable ethical standards (University of Arkansas for Medical Sciences Institutional Review Board classified this study (IRB # 261199) as Exempt, category [1], on 07/13/2020, based on Title 45 CFR 46.101.).

RESULTS

Question 1

Is there a relationship between students' module grades and their persistence level during COVID-19 academic interruption?

To answer this question, a Pearson product-moment correlation was conducted to assess the relationship between students' module grade and their persistence level during COVID-19 academic interruption. The analysis revealed that there was a strong and positive relationship between students' persistence level (M = 3.46, SD = .997, n = 79), and their module grade during COVID-19 (M = 258.777, SD = 14.6878, n = 79), r = .33, p = < .01. Overall, higher students' persistence level was associated with their higher module grade during COVID-19. Table 1 summarizes the correlation analysis.

Table 1

Correlations between 79 UAMS medical students' grades of the brain and behavior module2during the COVID-19 academic interruption and their reported persistence level

		Students' persistence level	Module Grade during COVID-19
Students' persistence level	Pearson Correlation	1	.330**
	Sig. (2-tailed)		.003
	Sum of Squares and Cross-products	77.595	377.620
	Covariance	.995	4.841
	N	79	79

Note. S*tatistically significant differences, at 0.01 level (2-tailed)*

Question 2:

What factors best predict the module grades of medical students during COVID-19 academic interruption?

To address the second question, the investigators conducted multiple regression analysis.

Multiple Regression Assumptions: The investigators the regression descriptive statistics output to check for multicollinearity assumption between predictor variables. The results output showed that correlations between variables were less than 0.6. The output indicated that none of included predictors has multicollinearity. The investigators found that predictor variables correlate with the outcome variable (module grade) and the relationship was in a straight line and the regression standardized residual on the y-axis and the x-axis within negative 3 to 3. Finally, the Cooks Distance was minimum of .000 and the maximum .101.

Multiple Regression Finding: The following are the included variables: students' familiarity with online learning, students' familiarity with technology use, the faculty help, the learning materials provided and students' perception about their persistence level. The investigators found that the predictor model was able to account for 14% of the variance in the dependent variable and it was statistically significant at p < .05. Individual predictors were examined further, and the result indicated that the only statistically significant predictor of students' module grades during COVID-19 academic interruption was their perception about their persistence (t = 2.731, p = .008). Tables 2 & 3 summarize the multiple regression finding.

Table 2

Model Summary Predictors: Online level, technology level, faculty help, learning materials and persistence level for 79 UAMS medical students

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
					R Square Change	F Change	df1	df2	Sig. F Change
1	.374a	.140	.081	14.0823	.140	2.370	5	73	.047

Note: *Dependent Variable: Total module Grade during COVID-19*

Table 3

Unstandardized and standardized coefficients and significance of independent variables

| Model | Unstandardized Coefficients | | Standardized Coefficients | | | Correlations | | | Collinearity Statistics | |
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	255.058	13.995		18.225	.000					
Enjoy online	-.911	1.700	-.060	-.536	.594	-.007	-.063	-.058	.930	1.075
Technology level	-.665	2.035	-.038	-.327	.745	-.120	-.038	-.036	.863	1.159
Faculty help	1.920	1.671	.136	1.149	.254	.150	.133	.125	.839	1.192
Enough Materials	-.371	.305	-.140	-1.216	.228	-.058	-.141	-.132	.883	1.132
Student's Persistence	4.725	1.730	.321	2.731	.008	.330	.305	.297	.854	1.171

Note: *Dependent Variable: Total module Grade. Predictors: (Constant), Enjoy online, Good with technology, Faculty help, Enough Materials and persistence level*

Research question 3:

Do medical students' grades during the COVID-19 academic interruption differ compared to students' grades prior to the pandemic?

To answer this question, the investigators conducted a one-way between subject's ANOVA to compare the effect of the COVID-19 academic interruption on medical students' grades compared to medical students' grades before the academic interruption. Prior to the analysis, the ANOVA assumption of equal variances was checked using Levene's Test (homoscedasticity). The result of Levene's test revealed that the homogeneity of variance assumption was violated. Therefore, the Robust Tests of Equality of Means was used to determine the significance of difference by using the Brown Forsythe. A one-way between subjects' ANOVA was then conducted to compare students' module grades of brain and behavior during the COVID-19 (spring 2020 semester) and students' grades in the three years prior to the COVID-19. The results indicated that there was a significant difference at the p<.001 level for all four years [F (3, 692) = 9.08, p = 0.001]. Post hoc comparisons using the Tukey HSD test indicated that the mean scores of students' in the brain and behavior module during COVID-19 (M = 88.78, SD = 5.61) was significantly higher compared to the mean scores of students' in the brain and behavior module during 2019 (M = 86.25, SD = 6.78), 2018 (M = 85.84, SD = 6.62), and during 2017 (M = 85.03, SD = 8.91). Taken together, these results suggest that students' grades in the brain and behavior during the COVID-19 academic interruption were the highest compared to the prior three years and these differences were statistically significant. Specifically, our results suggested that students' academic performance improved during COVID-19. Table 4 summarizes results from the ANOVA.

Table 4

Results of one-way between subjects' (ANOVA) compare between 174 UAMS medical students' grades of the brain and behavior module during the COVID-19 academic interruption and students' grades in the three years prior to the COVID-19 semester

Students' Grade

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1367.324	3	455.775	9.084	.000
Within Groups	34719.753	692	50.173		
Total	36087.078	695			

Note: *. *The mean difference is significant at the 0.05 level.*

DISCUSSION

The purpose of this study was to evaluate medical student persistence and academic performance in an online learning format developed during COVID-19 academic interruption. For this evaluation, medical students voluntarily participated in a survey which was developed related to medical students' persistence and academic performance during spring semester 2020.

Examination of the relationship between students' module grades and their perceived persistence level during COVID-19 academic interruption indicated a strong and positive relationship between students' brain and behavior module grades and their perceived persistence level during spring semester 2020. Specifically, students who reported higher persistence level also received higher module grades during COVID-19. These results are also consistent with the findings from other studies that concluded that persistence is a significant factor in students' success (Shechtman et al., 2013). Further, many studies implicate that individuals who persist to work and study through challenges are likely to reach higher achievement compared to others who lack similar facets (Duckworth & Gross, 2014; Huéscar Hernández et al., 2020; Miller-Matero et al., 2018).

Out of all the included variables in this study, the only statistically significant predictor of students' module grades during the COVID-19 academic interruption was their perception about their persistence. Our findings are consistent with the findings of other studies indicating that students' persistence is a significant predictor for their academic success (Bliss & Jacobson, 2020; Duckworth & Gross, 2014; Huéscar Hernández et al., 2020; Miller-Matero et al., 2018; Shechtman et al., 2013). A possible interpretation of these findings is that, in the context of the present study, it appeared that medical students have high levels of determination in the face of the extraordinary circumstances during the COVID-19 academic interruption. Furthermore, medical students with higher levels of persistence are more likely to overcome the problems they were faced during the spring semester 2020 and they were able to perform academically better. Further, that students' beliefs in their ability to learn are predictive of their subsequent perseverance. This interpretation is consistent with other findings indicating that students' persistence level predicts their academic achievement over and beyond their talent (Duckworth & Quinn, 2009).

Interestingly, student grades in the Brain and Behavior Module during the COVID-19 lockdown were higher compared to grades in three years prior to the COVID-19. Together,

these findings suggest that the persistence of medical students allowed them to adapt to meet and surpass the challenges triggered by the COVID-19 learning environment. A possible interpretation of these results is that students included in this study were freshman medical students with a high level of academic persistence, adaptability, and intelligence. Students adapted and successfully used the remote learning materials and their administration provided by the Brain and Behavior faculty. Despite having no time to prepare, the faculty considered students' diverse learning styles to counterbalance the missing elements of the face-to-face instruction in the emergency. Online learning contents included blackboard collaborate live- and pre-recorded lectures, live reviews via Zoom, live Q&A sessions using Turning Point mobile polling with Blackboard and electronic mail, use of audio narrated Power Point slides, and YouTube video demonstrations including games, reinforcing course contents. This interpretation is consistent with prior research that indicated students' personal factors such as persistence level and self-beliefs are the most powerful predictors of first year students' success. These factors regarding intentions to persist, fail or drop out of school are incorporated as they navigate their first independent experiences in the adult world (Walsh & Robinson Kurpius, 2016). Interestingly, many researchers have found first year students' self-beliefs strongly related to their academic persistence across ethnicity and gender (Gloria, 1997; Gloria et al., 2005; Gloria et al., 1999; Gloria & Robinson Kurpius, 2001; Rayle et al., 2005; Rayle et al., 2006).

Limitations of this study include student sample size and the switch to a pass/fail grading system to alleviate student stress unlike in prior years.

CONCLUSION

This study was conducted to examine the possible impact of COVID-19 lockdown on the medical students' academic performances. Despite the pandemic related challenges, students were able to maintain an adequate effort and succeed through their persistence. In absence of in-person communication with the faculty and peers, live online events to keep students engaged proved useful and were appreciated by the students. Brain and Behavior Module grades in the three years before the pandemic compared to those during COVID-19 indicated student's grades were higher during the COVID-19 semester. We concluded that the students' persistence as they adapted to an emergency that created a new, fully remote learning environment with steps taken by the module directors and other faculty allowed students to overcome the learning challenges and maintain high level of academic success.

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Classroom management of pre-service and beginning teachers: From dispositions to performance

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Abstract:

Classroom management is a central aspect of effective teaching. It is related to student motivation and learning achievement. Unfortunately, pre-service and beginning teachers lack on classroom management competence. Therefore, this study aims to find out, which classroom management facets pre-service and beginning teachers struggle with and how they are associated with each other. Professional knowledge, self-efficacy, professional vision, and performance of 206 pre-service and beginning teachers were measured. As a result, medium to high levels of classroom management competence were found. Although self-efficacy and knowledge were partially associated with professional vision, professional vision was not significantly related to performance. Implications for further research on classroom management are discussed.

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INTRODUCTION

Classroom management is a central aspect of effective teaching (Kunter et al., 2013; LePage et al., 2007; Seidel & Shavelson, 2007). Although there are other important aspects of teaching quality, such as supportive climate or instructional support (Baumert et al., 2010; Hamre et al., 2013; Kunter & Voss, 2013; Lipowsky et al., 2009), classroom management is also a prerequisite for other quality indices (Emmer & Stough, 2001; Klieme et al., 2001). It has additionally been found that effective classroom management is directly related to student motivation (Helmke, 2007; Kunter et al., 2007; Nie & Lau, 2009; Oliver et al., 2011), autonomy and responsibility (Elias & Schwab, 2006; Lewis et al., 2012; Pšunder, 2005), learning achievement (Freiberg et al., 2009; Hattie, 2009; Seidel & Shavelson, 2007; Wang et al., 1993) as well as teacher wellbeing (Dicke, Elling, et al., 2015; Klusmann et al., 2008) and their psychological health (Friedman, 2006; Hastings & Bham, 2003).

Although classroom management plays a major role in central teaching outcomes, studies show that especially pre-service and beginning teachers lack knowledge on classroom management (Poznanski et al., 2018). They also feel unprepared for dealing with classroom disruptions and dealing with difficult student behaviors (Meister & Melnick, 2003; Parsad et al., 2001). Consequently, many teachers burn out or leave the profession within the first five years of teaching, citing challenging student behavior as a significant reason (Common Good, 2004; Ingersoll, 2002).

Therefore, it may be appropriate getting a deeper understanding of how far pre-service teachers' and beginning teachers' classroom management is developed, concerning formal components like knowledge or performance as well as content-related facets like monitoring, managing momentum, or rules and routines.

One decisive mediator between knowledge and performance, which should be included, are situation-specific cognitive skills (Blömeke & Kaiser, 2017) such as a professional vision of classroom management that lays the ground for adaptive teaching over the course of a lesson. In contrast to knowledge, these "cognitive processes prior to, during, or following real-life performance [...] [are] organized along specific characteristics of classroom situations" (Blömeke & Kaiser, 2017, p. 795-96).

The present study aims to provide a detailed picture of the quality of pre-service and beginning teacher knowledge, professional vision as a situation-specific cognitive skill and performance concerning classroom management. The results should provide a sound basis for the advancement of future teacher training and education programs regarding the structure and development of classroom management competence.

Facets of effective classroom management

Classroom management includes all actions taken by teachers to maintain smooth and productive classroom settings, so as to maximize learning time (Doyle, 1986; Gettinger &

Kohler, 2018). The process entails both preventive and reactive strategies (Sugai & Horner, 2006), assuming that preventive strategies have a higher impact on maximizing learning time (Oliver et al., 2011).

Classroom management includes various facets. Firstly, teachers have to be alert to potential classroom disruptions and be prepared to react constructively, which is widely known as "withitness" (Kounin, 1970), or as "active supervision" (De Pry & Sugai, 2002). Furthermore, teachers need to react to different student actions simultaneously (Kounin, 1970; Simonsen et al., 2008). These two aspects refer to the facet of monitoring (Gold & Holodynski, 2017).

The second facet of classroom management is called managing momentum, which encompasses teacher behavior that ensures a steady learning flow (Anderson et al., 1979; Kounin, 1970). For instance, the teaching pace should be neither be too slow or too fast, and transitions conducted smoothly (Anderson et al., 1979; Charles, 2013; Kounin, 1970). Finally, teachers should maintain a group focus through engaging the attention of all students, getting as many students as possible to participate, and giving feedback on student participation and learning activities (Kounin, 1970).

Establishing rules and routines is a third facet of successful classroom management (Evertson & Emmer, 1982; Emmer et al., 1980; Lester et al., 2017; Malone & Tietjens, 2000). Teachers have to introduce rules and routines that support learning in a classroom setting, and to consequently supervise and ensure compliance with them (Elias & Schwaab, 2006; Emmer & Gerwels, 2006; Evertson & Emmer, 2012; Little & Akin-Little, 2008; McGinnis et al., 1995).

Overall, these three facets entail what Duke sums up as "provisions and procedures necessary to establish and maintain an environment in which instruction and learning can occur" (Duke, 1979, p. xii). For effective teaching, a first prerequisite is to be aware of these provisions and procedures, but this alone is not sufficient for effective classroom management.

Classroom management: from dispositions to performance

To obtain a more comprehensive picture of which factors affect classroom management performance, we applied the Perception-Interpretation-Decision Model (PID-model of Blömeke et al., 2015; Blömeke & Kaiser, 2017). This suggests that teaching performance is determined – beyond conveying knowledge – by a teacher's ability to perceive and interpret classroom events that are relevant for student learning, and to decide how to (re-)act appropriately to these events (see Figure 1). These components are called situation-specific cognitive skills, and especially perception and interpretation represent central aspects of what is also conceptualized as professional vision (Sherin & van Es, 2009). Santagata and Yeh (2016) conducted interviews with beginning teachers, who confirmed the moderating role of these situation-specific cognitive skills, especially in the first years of practice. Two

major prerequisites of such situation-specific cognitive skills are professional knowledge and affect-motivation (Figure 1).

Professional knowledge that is relevant for teaching mainly consists of content knowledge, pedagogical content knowledge and (general) pedagogical knowledge. Classroom management knowledge is related to the latter one (Shulman, 1986; Baumert & Kunter, 2013). Affect-motivation is essentially formed by professional beliefs, motivation, and the ability of self-regulation (Döhrmann et al., 2012). A central facet of affect-motivation with respect to classroom management is classroom-related self-efficacy. This concept refers to people's belief in their capability to conduct the actions required to complete a given task successfully (Bandura, 1997).
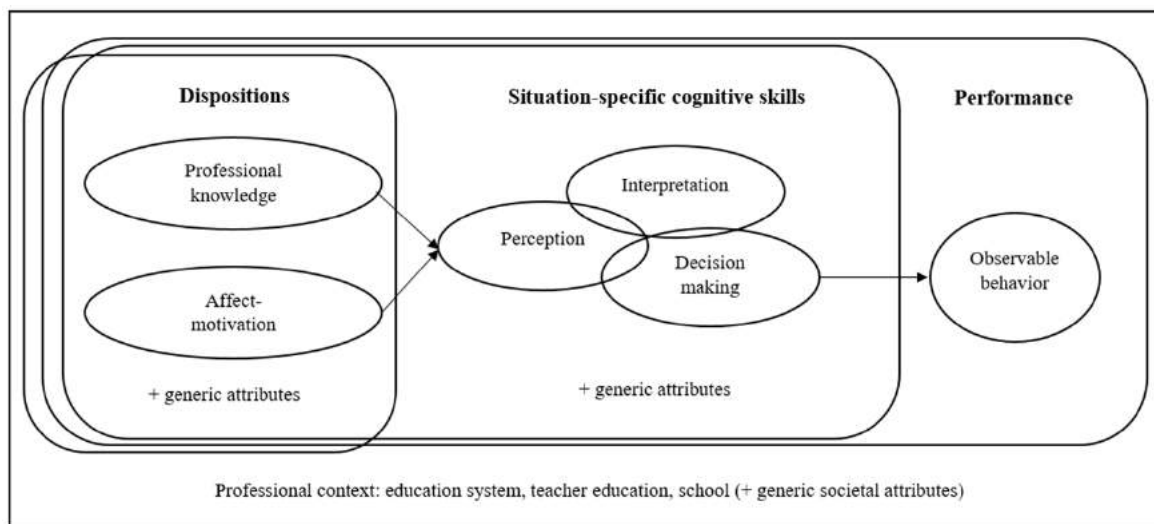
Figure 1. Perception-Interpretation-Decision Model (PID-model) as it is described by Blömeke et al. (2015) and Blömeke & Kaiser (2017)

There are a few studies exploring the association between dispositions and situation-specific cognitive skills regarding classroom management, as well as other teaching-related competencies. For example, regarding the association between professional knowledge and situation-specific cognitive skills, studies by Blömeke et al. (2014), Kersting et al. (2010), Kersting et al. (2012), König et al. (2014), as well as Meschede et al. (2017), revealed significant correlations between purely content knowledge, pedagogical content knowledge, as well as pedagogical knowledge, and situation-specific cognitive skills. Focussing on classroom management, Gold and Holodynski (2017) found a moderate correlation between classroom management knowledge and professional vision (as situation-specific cognitive skills) of classroom management.

Concerning the association between self-efficacy beliefs as a facet of affect-motivation and professional vision, studies by Gold et al. (2017) and Keppens, Consuegra, and Vanderlinde (2019) both found a positive association between professional vision and self-efficacy in pre-service and beginning teacher education.

Finally, with respect to the association between teaching performance in the sense of observable teaching behavior, positive associations between professional vision and teaching performance as well as teaching outcomes could already be found (Kersting et al., 2010; Kersting et al., 2012; Roth et al., 2011). However, for the domain of classroom management, studies have revealed mixed results. König and Kramer (2016) found a significant moderate positive association between professional vision of classroom management and classroom management performance assessed through student ratings. However, Gold et al. (2021) could not replicate these findings on a larger sample, using a similar measurement of classroom management performance, namely student ratings, but a different measure for professional vision.

Differences in expertise between pre-service teachers and beginning teachers

Concerning the associations between dispositional and situational skills, it is instructive to know whether there are any differences in the quality and strength of these associations between pre-service teachers and beginning teachers. Since the latter are already teaching in schools and engage with teaching issues, they may display a rather different profile of these dispositional and situational skills than pre-service teachers who are confronted with them mainly in academic courses at their university.

Looking at the educational status and professional experience of participants, there are studies which focus exclusively on experienced in-service teachers (Blömeke et al., 2014; Gold et al., 2021; Kersting et al., 2010; Kersting et al., 2012; Roth et al., 2011), or solely on pre-service teachers (Gold et al., 2017). Others have combined the examination of pre-service teachers, beginning teachers, and experienced in-service teachers (Gold & Holodynski, 2017; König & Kramer, 2016; Meschede et al., 2017) and found a significant difference in the level of professional vision regarding classroom management (d = 0.35) between pre-service teachers (with a bachelor degree) and experienced in-service teachers (Gold & Holodynski, 2017). The study of König and Kramer (2016) confirmed this result, but revealed a significant difference even between pre-service teachers and beginning teachers (d = 0.37), as well as between beginning teachers and experienced teachers (d = 0.61). Unfortunately, to the best of our knowledge, there are no studies which compared the associations between dispositional and situational skills, depending on the level of teaching experience. Theoretically, it might be assumed that pre-service teachers' knowledge structures are less interwoven with situation-specific cognitive skills than those of beginning teachers, because, in contrast to beginning teachers, pre-service teachers rather lack possibilities to apply their knowledge on specific situations (Renkl, Mandl, & Gruber, 1996).

Concerning the association between self-efficacy beliefs as a facet of affect-motivation and professional vision, studies by Gold et al. (2017) and Keppens, Consuegra, and Vanderlinde (2019) both found a positive association between professional vision and self-efficacy in pre-service and beginning teacher education.

The present study

The present study has two aims. First, levels and associations between classroom-management-related knowledge, self-efficacy beliefs, and professional vision will be examined, looking for possible differences between pre-service and beginning elementary school teachers. We hypothesized that beginning teachers would display slightly higher levels of knowledge, since they already had a master degree. We also assumed that beginning teachers have a more accurate professional vision of classroom management, since they have gathered more experience. By contrast, since beginning teachers experience their career entries very differently (Björk, Stengård, Söderberg, Andersson, & Wastensson, 2019), we assumed that self-efficacy beliefs would be almost equal between the two groups. Concerning the associations between knowledge, self-efficacy beliefs, and professional vision, we did not expect any differences.

Second, this article explores the associations between dispositional skills (namely knowledge and self-efficacy beliefs), situation-specific cognitive skills (namely professional vision), and teaching performance in the domain of classroom management. Relying on the PID-Model and previous findings, we expected a significant positive association between professional vision and knowledge, as well as self-efficacy beliefs concerning classroom management. Moreover, we hypothesized a significant positive association between professional vision and classroom management.

METHOD

Sample and procedure

The sample consisted of 206 pre-service and beginning teachers educated in the State of North-Rhine-Westphalia, Germany. In contrast to many other countries (for an overview see Howe, 2006), German teacher education consists of two phases. The first phase takes place at universities for about five years and entails a scientific-based education. Pre-service teachers study two teaching subjects and attend general courses in Educational Sciences. The second phase, that of "induction", mainly takes place in school, accompanied by courses regarding subject-specific and general principles of teaching at a teacher training college and lasts about 18 months.

We collected data from both phases. 85 participants of this study were pre-service elementary school teachers (first phase), who were graduate students (had earned a bachelor degree) and had just commenced their practical semester in which they taught at a school for half a school year. 73 percent of the pre-service teachers were female. On average they were 25.44 years old (SD = 3.26) and were in their fourth year of study. They had 12.48 hours of previous lesson experience (SD = 29.25).

Additionally, 121 participants of this study were beginning elementary school teachers, who had already attended the induction phase at school (second phase). 89 percent of the beginning teachers were female. On average they were 26.31 years old (SD = 2.82). They had 38.95 hours of teaching experience (SD = 29.93), which included lessons given during their practical semester.

All participants were asked to complete an online questionnaire as an obligatory part of their training courses. The questionnaire was administered via unipark (https://www.unipark.com/) and required 45 minutes on average for completion. The survey measured participants' pedagogical knowledge, self-efficacy beliefs, and professional vision concerning classroom management.

Moreover, 52 of the 121 beginning teachers (second phase) had recorded one of their lessons, after schools and parents had given permission for recording. Each of these participants recorded one lesson of their own teaching with an HD-camera, which displayed the whole classroom. They uploaded the video file immediately afterwards for an analysis of their classroom management performance. These 52 beginning teachers did not differ significantly from the remaining 69 regarding their classroom-management-related knowledge (M_{video} = 0.78, SD = 0.08; $M_{no\ video}$ = 0.76; SD = 0.08; $t(118)$ = 0.78, p = .435, d = 0.15), self-efficacy beliefs (M_{video} = 0.61, SD = 0.12; $M_{no\ video}$ = 0.62; SD = 0.15; $t(119)$ = -.13, p = .899, d = -0.02) , or professional vision (M_{video} = 0.50, SD = 0.23; $M_{no\ video}$ = 0.44; SD = 0.20; $t(119)$ = 1.61, p = .109, d = -0.29).

We followed ethical and data privacy guidelines, as we had informed all beginning teachers in the study, the principals of their schools and the parents of the recorded classes about the study and had obtained written consent from all members. The videos and survey results were stored on a protected university server.

Instruments

Classroom management knowledge

To assess classroom management knowledge, the ProwiN-Test (Lenske et al., 2015) was used, which covers two forms of knowledge (declarative and procedural-conditional) on relevant teaching topics (classroom management, teaching methods, individualized instruction and feedback). The test provides six tasks for assessing knowledge of classroom management, two of them measuring declarative knowledge and four of them procedural-conditional knowledge.

Each of the two tasks for measuring declarative knowledge consists of a question ("What are effective strategies for preventing classroom disruptions?", "What are effective strategies for optimizing procedures between different learning activities?") with a set of five more or less effective strategies. Participants had to evaluate for each strategy, how much they agree that it is suitable for the particular task, based on a Likert scale (ranging from 1=very much to 4=not at all). For each set of strategies, eight research experts in the

domain of classroom management compiled a consensual expert rating concerning whether a strategy is either suitable or unsuitably. Participants' answers were compared with these expert ratings. They received one point for each case for which they could reproduce the experts' rating. The final test score was calculated as the proportion of correct answers to the number of potentially correct answers, and ranged from 0 to 1.

To assess procedural-conditional classroom management knowledge, participants read four vignettes of critical classroom situations. For each vignette, a set of four to six classroom management strategies were offered (vignette example: "Imagine that a teacher wants to check the class's homework. What can he/she do to optimize the procedure?"; related strategies: (1) "The teacher can ask the students to come to his/her desk to do the checking.", (2) "The teacher can patrol the rows of desks and control homework during discussion.", (3) "The teacher can ask a student to collect all the homework and check it all while students continue working.", (4) "The teacher can patrol the rows of desks and check the homework at the beginning of the lesson." (5) "The teacher can patrol the rows of desks and check the homework while students work."). Participants had to judge on a Likert scale, how well the proposed strategy fits the described critical situation (ranging from 1 = very well to 6 = insufficiently). The ProwiN-Test provides an expert rating for the relative effectiveness of each strategy within each vignette, that yields a rank order of the proposed strategies for each vignette. If a participant reproduced the relative rank order of the expert rating between two answers, they received one point. For example, if the experts rated Strategy 1 to react as more effective than Strategy 2 (1 > 2), participants received a point if they also ranked Strategy 1 higher than Strategy 2. For rating both strategies as equally effective, they received half a point, for evaluating Strategy 1 as less effective than Strategy 2 or a missing judgement, they obtained zero points. The final test score was calculated as proportion of correct pair comparisons to the number of potentially correct pair comparisons, and ranged from 0 to 1.

In the original study, both parts of the test yielded satisfactory to moderate reliability scores, namely Cronbach's α = .86 for procedural-conditional knowledge and Cronbach's α = .61 for declarative knowledge (Lenske et al., 2015).

Since we used only the six tasks for classroom management, we combined the scores of declarative and procedural-conditional knowledge (with a weight of 2 and 4) to form a general pedagogical knowledge score. For general classroom management knowledge, the test showed a relatively poor internal consistency (α = .48).

Self-efficacy beliefs about classroom management

Self-efficacy beliefs regarding classroom management were assessed with the validated questionnaire "Adapted Measure of Teacher Self-Efficacy for Pre-service Teachers" by Pfitzner-Eden et al. (2014), which is itself based on the TSES (Tschannen-Moran & Woolfolk Hoy, 2001). Participants had to evaluate each of the four items ("How certain are you that you can… (1) control disruptive behaviour in the classroom? (2) get

students to follow classroom rules? (3) calm a student who is disruptive and noisy? (4) keep a few problem students from ruining an entire lesson?") on a 9-point Likert scale ranging from "1 (not at all certain I can do)" to "9 (absolutely certain I can do)". As in the validation study (α = .91-.94), the self-efficacy scale revealed a very good internal consistency (α = .87) in the present study. The sum of the four items was divided by 36 (maximum of points) to generate a self-efficacy score ranging from 0 to 1.

Professional vision of classroom management as a situation-specific cognitive skill

Blömeke et al. (2015) suggest perception, interpretation and decision-making as factors influencing teaching performance. We used a validated video-based test measuring professional vision of classroom management (Gold & Holodynski, 2017), which mainly covers the interpretation of classroom events that are relevant for classroom management. The test consists of three video clips from early science lessons in primary schools (2nd and 3rd grade) lasting 2 to 5 min that were selected from a set of 29 lesson clips on the basis of an expert rating. In these lesson clips, students discussed hypotheses on physical phenomena, conducted experiments to test them, and discussed their experimental results. One clip shows clearly improvable classroom management, and both others quite good classroom management. Participants had to rate these three lesson clips regarding 42 rating items, on a 4- point Likert scale, ranging from 1 = totally disagree to 4 = totally agree), which referred to the three facets of classroom management described in the introduction. The ability to interpret the observed teacher's monitoring was measured by items such as "The teacher does not notice that remarkably many of the students do not follow the change from experimenting to presenting", whereas managing momentum was represented by such items as "The transition between the experiments and the reflection phase including student presentations is conducted too quickly". Establishing rules and routines was evaluated using such items as "Thanks to the sound signal, the first group can quickly begin their presentation."

Participants' answers were compared to an expert rating by 16 experts on educational psychology in general and classroom management in particular. One point was given for exact agreement with the experts' consensual answer and zero points for the other scale values. The final test score was calculated as the proportion of correctly judged items to the whole number of 42 items and ranged from 0 to 1. The item sets for each of the three classroom management facets monitoring, managing momentum, and establishing rules and routines revealed moderate internal consistencies ($\alpha_{monitoring}$ = .76, $\alpha_{managing\ momentum}$ = .69, $\alpha_{rules\ and\ routines}$ = .64).

Classroom management performance

Classroom management performance of the beginning teachers was rated via a coding manual that Lenske et al. (2016) developed for rating teaching performance regarding the facets of monitoring, managing momentum, and establishing rules and routines, as well as dealing with disruptions. For the present study, we combined the facets dealing with

disruptions and monitoring, because both facets overlap and we intended to match the three facets of the professional vision test with the respective facets of the performance rating.

The rating procedure was conducted as follows. Each beginning teacher prepared and taught a lesson in mathematics or German, which lasted about 45 min and which was recorded with one HD-camera that covered the whole class. Trained judges watched each recorded lesson by using a time-sampling procedure. For each 5 min time slot, they made detailed notes of the three classroom management facets and summarized the quality of each of the three facets on a 4-point scale (1 = very poor, 2 = rather poor, 3 = rather good, 4 = very good), for each 5 min time slot. The final performance scores on classroom management for each pre-service teacher was calculated as the mean across all 5-min ratings of his or her lesson for each classroom management facet. The scores ranged from 1 (very poor) to 4 (very good) and were converted into an average score ranging from 0 to 1.

The training of the performance evaluation lasted 6 hours and contained the following components. (1) Information about classroom management and its three facets (monitoring, managing momentum, establishing rules and routines) with a detailed coding manual referring to positive and negative behavioral indicators of each facet, (2) video demonstrations of each facet as well as (3) exercises of video analysis with feedback by experts and an expert rating.

Four judges participated in the training. For assessing the interrater reliability of the performance ratings, the four trained judges evaluated 16 (30%) recorded lessons, which were randomly selected from the total number of 52 recorded lessons. Interrater reliability was calculated with unadjusted ICC, which also assigned substantial mean differences between judges to error variance. Raters' overall classroom management coding yielded a very good interrater reliability $ICC_{CM \; unadjusted}$ = .82). The coding on the facets monitoring and establishing rules and routines revealed a good interrater reliability ($ICC_{monitoring}$ = .78, $ICC_{rules \; and \; routines}$ = .77). The interrater reliability of managing momentum ($ICC_{managing \; momentum}$ = .53) was only moderate, but still acceptable (Cicchetti, 1994; Koo & Li, 2016). This low interrater reliability was caused by significant mean differences between judges. As overall the interrater reliability was satisfactory, the remaining 36 recorded lessons were coded by only one trained rater.

Data analysis

For testing statistical prerequisites (linear relationship between variables, search for outliers, etc.), for displaying descriptive statistics, and calculating t-tests, we used IBM SPSS Statistics 25 (IBM, 1983-2017). For performing moderator analysis, we additionally applied the IBM SPSS Package PROCESS 3.5 (Hayes, 2018).

Path analyses were conducted with IBM SPSS Amos 25.0.0 (IBM, 1983-2017). We chose to work only with manifest variables because the sample size was insufficient for structural equation modelling. Figures were also designed with IBM SPSS Amos 25.0.0 (IBM, 1983-

2017). Performance was not included in this comparison between pre-service teachers and beginning teachers, because pre-service teachers were still at university and could give nor record any lesson.

RESULTS

Differences in Classroom Management Knowledge, Self-Efficacy, and Professional Vision between Pre-service and Beginning Teachers

Table 1 shows the descriptive statistics for pre-service teachers and beginning teachers regarding their knowledge, self-efficacy beliefs, and their professional vision.

Table 1

Classroom Management Knowledge, Self-Efficacy, and Professional Vision for Pre-Service Teachers and Beginning Teachers

Variable	Pre-service teachers		Beginning teachers				
	M	*SD*	*M*	*SD*	*t*	*p*	*Cohens' d*
Pedagogical knowledge	.75	.09	.76	.08	-1.38	.16	-.11
Self-efficacy beliefs	.61	.14	.61	.13	.06	.94	.00
Professional vision	.43	.20	.46	.21	-.89	.37	-.14
Monitoring	.38	.21	.40	.24	-.80	.42	-.08
Managing momentum	.47	.23	.50	.24	-.59	.55	-.12
Establishing rules and routines	.45	.22	.49	.21	-1.08	.28	-.18

Note. Each variable was standardized to a scale between 0 and 1. A score of 1 means 100% agreement with an expert rating for pedagogical knowledge and professional vision, a very good performance rating, and a maximum of self-efficacy beliefs.

Pre-service teachers and beginning teachers did not differ significantly regarding pedagogical knowledge, self-efficacy, and professional vision.

To examine whether the predictors pedagogical knowledge and self-efficacy beliefs are associated differently with the dependent variable professional vision of classroom management regarding pre-service teachers and beginning teachers, we included the educational status as moderating variable (Cohen et al., 2003).

Table 2

Multiple regressions on the professional vision of classroom management including moderator analysis

Predictor	Dependent variable (professional vision)	Pre-service teachers		Beginning teachers		group x predictor	
		β	p	β	p	β	p
Pedagogical knowledge	Classroom management	.01	.95	.19	.04	.23	.24
	Monitoring	.01	.92	.16	.08	.20	.27
	Managing momentum	-.07	.52	.12	.17	.23	.17
	Establishing rules and routines	.08	.47	.25	.01	.21	.35
Self-efficacy beliefs	Classroom management	.26	.02	.21	.02	-.02	.86
	Monitoring	.27	.01	.16	.07	-.06	.64
	Managing momentum	.27	.01	.17	.07	-.09	.51
	Establishing rules and routines	.16	.15	.25	.01	.10	.47

In the sample of pre-service teachers, we did not find an association between their pedagogical knowledge and professional vision, whereas we indeed found this correlation for the total scale as well for the facet of establishing rules and routines in the sample of beginning teachers. Anyway, moderator analysis showed no significant interaction between predictor and group while predicting professional vision (Table 2).

Regarding self-efficacy beliefs, significant positive associations emerged in the total scale of professional vision for both teacher groups. The interaction term for self-efficacy beliefs was also not significant, revealing that the association between self-efficacy beliefs and professional vision was quite similar in both groups.

Level of and Associations between Pedagogical Knowledge, Self-efficacy Beliefs, Professional Vision, and Performance

Because pre-service and beginning teachers did not differ in the means concerning their dispositions (pedagogical knowledge and self-efficacy beliefs) and situation-specific cognitive skills (professional vision of classroom management), we computed the overall means and associations regarding these variables and performance. As can be seen in Table 3, pedagogical knowledge, self-efficacy beliefs and performance scores on classroom

management revealed quite a high level for pre-service and beginning teachers. By contrast, their professional vision as a situation-specific cognitive skill was located in the lower mid-range of the scale. Moreover, the standard deviations of professional vision were twice as high as the standard deviations of the other variables.

Table 3

Overall level of classroom management competence

Classroom management skills	N	M	SD	min	max
Pedagogical knowledge	203	.76	.09	.27	.96
Self-efficacy beliefs	204	.62	.14	.25	.94
Professional vision	204	.46	.21	.00	.96
Monitoring	204	.40	.23	.00	1.00
Managing momentum	204	.49	.24	.00	1.00
Establishing rules and routines	204	.48	.22	.00	1.00
Performance	52	.81	.12	.54	.98
Monitoring	52	.81	.13	.42	1.00
Managing momentum	52	.81	.15	.47	1.00
Establishing rules and routines	52	.80	.14	.42	1.00

Concerning the associations between the variables, self-efficacy beliefs were significantly related to professional vision, whereas pedagogical knowledge was not. Additionally, pedagogical knowledge and self-efficacy beliefs were not associated with each other. Finally, performance ratings could not be accurately predicted by professional vision (Figure 2).
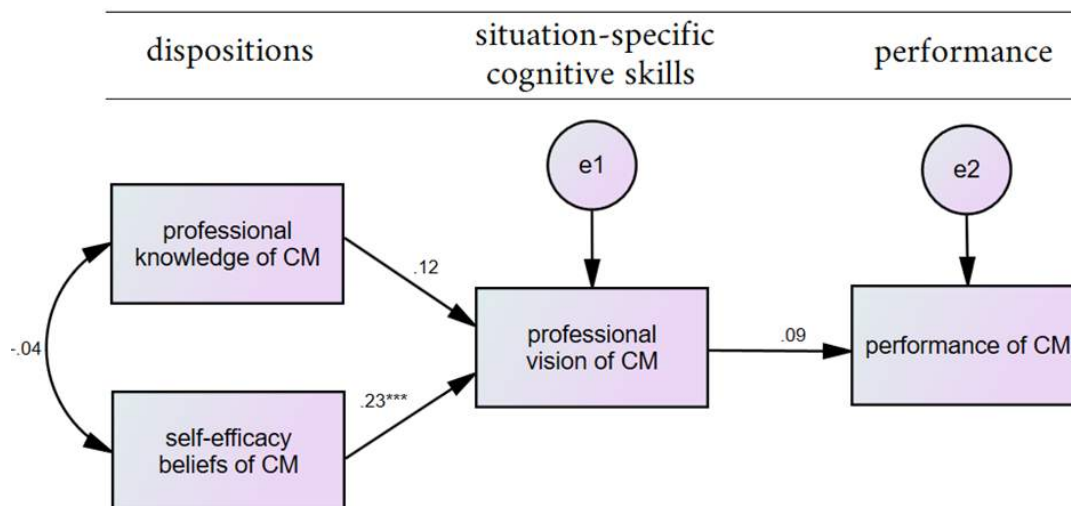
Figure 2. Path analysis including professional knowledge, self-efficacy beliefs, professional vision, and performance

Figure 3 shows these associations in more detail. In fact, self-efficacy beliefs were significantly associated with all three facets of professional vision concerning classroom management, whereas pedagogical knowledge was only significantly related to professional vision of establishing rules and routines.
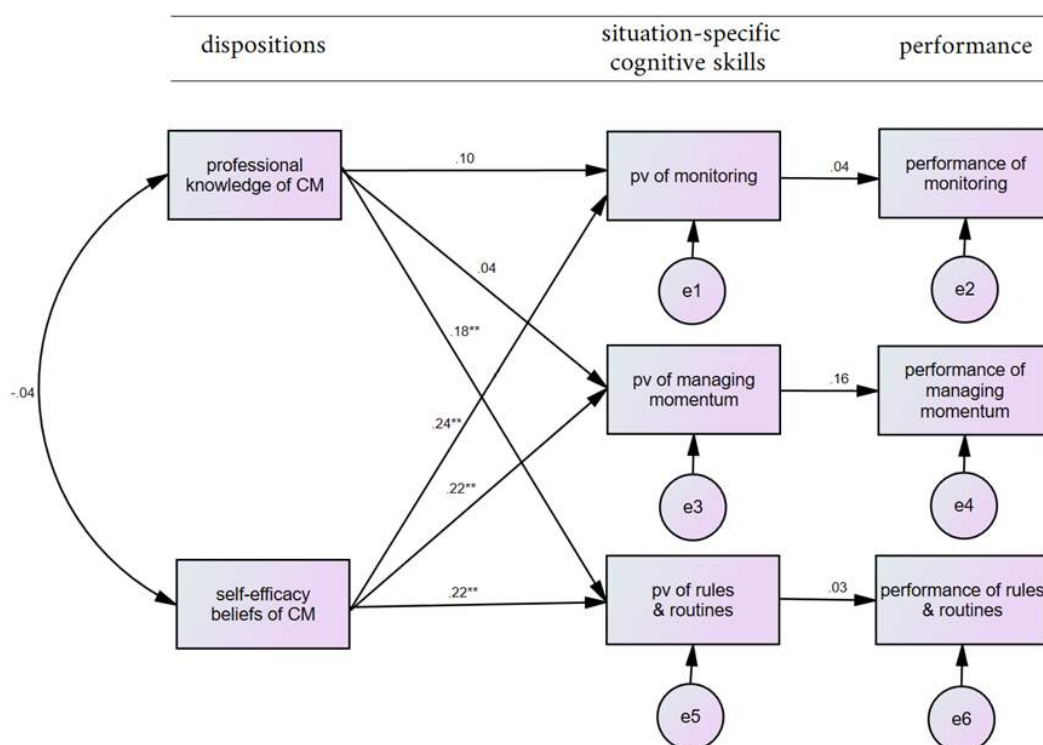
Figure 3. Path analysis including professional knowledge, self-efficacy beliefs, professional vision, and performance including the facets of classroom management concerning professional vision and performance

Consequently, professional vision of establishing rules and routines was more accurately predicted by pedagogical knowledge and self-efficacy beliefs (R^2 = .077) than professional vision of monitoring (R^2 = .052) or managing momentum (R^2 = .048). As already shown in Figure 2, performance was not significantly associated with professional vision, although there were noticeable differences between the three facets. In contrast to the performance of monitoring as well as rules and routines, the performance of managing momentum showed a small positive, but insignificant correlation with professional vision of managing momentum.

DISCUSSION

The aim of this study was to provide an understanding of the classroom management competence of pre-service and beginning teachers analysing dispositions, situation-specific cognitive skills, and performance. The results should help us to understand the associations between pedagogical knowledge, self-efficacy beliefs, and professional vision as a situation-specific cognitive skill, as well as performance within the first year of teaching practice. During this phase, a lack of classroom management competence is referred to as a main reason for burnout or dropout (Common Good, 2004; Ingersoll, 2002; Meister & Melnick, 2003; Parsad et al., 2001).

Comparison between pre-service and beginning teachers

We did not find any significant differences between pre-service and beginning teachers in terms of their levels of pedagogical knowledge, self-efficacy beliefs, and professional vision. This confirms our first hypothesis concerning self-efficacy beliefs, but contradicts our hypothesis concerning pedagogical knowledge and professional vision. Obviously, the (small) number of additional university courses, the writing of their master thesis and additional practical experience may not improve these skills to a reasonable extent.

Association between self-efficacy beliefs and professional vision

Concerning this association, our hypothesis could be confirmed that both variables were positively related, in fact for both teacher groups. This is in line with the PID-model of Blömeke and Kaiser (2017) and validates earlier results showing the joint growth of both factors in the context of teacher training (Cocca et al., 2019; Gold et al. 2017; Honskusová & Rusek, 2019). However, one exception occurred when looking at the facets of professional vision. Pre-service teachers showed a higher correlation between their self-efficacy beliefs and their professional vision of managing momentum than beginning teachers.

Association between pedagogical knowledge and professional vision

Concerning this association, we found a shift. For pre-service teachers, pedagogical knowledge was not correlated with their professional vision, while for beginning teachers, these variables were already more positively correlated. Although these differences in associations were not significant, an explanation might be that the beginning teachers of our sample had been stayed at a school for half a year during their practical semester, while pre-service teachers had not. Accordingly, the former reported around 26 hours of teaching experience more than the pre-service teachers. This additional classroom experience might have supported beginning teachers in relating their relatively high level of pedagogical knowledge to their perception and interpretation of classroom events, thus increasing the association between their knowledge and professional vision. Up to now, no empirical study has investigated whether pre-service teacher teaching experience during their practical semester could lead to such an increased association. Therefore, the findings should be replicated in further studies.

Association between professional vision and performance

The positive association between both combined scales did not reach significance. The same non-significant results occurred when calculating the associations between professional vision and performance of the corresponding three facets of classroom management. These results contradict our second hypothesis that both variables are positively associated, and is also at odds with the results of König and Kramer (2016), but in line with the non-significant results of Gold et al. (2021) who had both measured teaching performance through student ratings. One remarkable similarity between both non-significant studies is the exceptionally high scores for teaching performance. All teachers were judged to display good to very good classroom management, while their professional vision measured through a video-based test ranged from very weak to very good.

While the high performance scores of Gold et al. (2021) may be due to desirability bias from primary school students who had rated their teacher's classroom management, the high performance scores in the current study are surprising because the teachers judged were beginners, a group that can be expected to have problems with classroom management. A desirability bias on the part of the raters can be ruled out, because all raters used a validated manual, were extensively trained, and revealed good interrater reliabilities. One possible explanation of the high performance scores could be linked to the impact of the situational context of the selected class, which is also mentioned in the PID-Model (Blömeke & Kaiser, 2017). The beginning teachers in our study did not yet teach an own class, but the class of their mentor, who was present during the lesson they taught for this study. Mentors probably already had established effective rules and routines of classroom management. Our beginning teachers may rely on these established rules and routines making their lesson smooth and lively regardless of their professional vision. Additionally, Weiner (2003) pointed out that the degree of challenge in monitoring and establishing rules

and routines might depend heavily on the previous social experiences of students, which also belong to the situational context of each particular class. To rule out this confounding condition, it seems necessary to rate classroom management performance only of teachers who teach their own class, and to compare it with their professional vision.

The results of this study only partially confirm the assumptions of the Perception-Interpretation-Decision Model (Blömeke & Kaiser, 2017). At the same time, our findings indicate a need to differentiate the PID-Model, especially regarding the concept of classroom management. It may be important to build clearer concepts regarding the influence of the situational context of the classes (e.g. teaching one's own class or a mentor's class) on the development of professional vision as a situation-specific cognitive skill and performance regarding classroom management.

LIMITATIONS AND RECOMONDATIONS

The present study entails some methodological limitations. Firstly, we focused mainly on self-efficacy beliefs as one of several aspects of affect-motivation. However, Döhrmann et al. (2012) stated that other content-related beliefs, motivation, and the ability of self-regulation also belong to affective-motivational dispositions. Including these variables might explain more of the inter-individual variance of professional vision that we found between pre-service and beginning teachers. Secondly, we only operationalized professional vision as a situation-specific cognitive skill (Sherin & van Es, 2009). Perception and decision were not part of our instrument for measuring professional vision, which should be considered in further studies. Thirdly, it would have been helpful to use structural equation modelling to consider all variables (from dispositions to performance) in one model. Unfortunately, only 23.3 percent of the participants were willing to grant scientific access to their lessons, so that we had to use a manifest model. Finally, to ensure higher validity for the measurement of pre-service teacher performance, the additional measurement of student learning outcomes would have been a useful indicator (Nilsen & Gustafsson, 2016).

CONCLUSION

Overall, this study provides insightful results concerning the classroom management competency of pre-service and beginning teachers from dispositions to performance, to which new teacher training and education programs could refer. However, further research is needed to validate these results, including more comprehensive consideration of affective-motivational and contextual factors.

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Research

An Analysis of Cartoons in Terms of Values Education in Turkey

Vedat Aktepe [1]

Abstract:

Cartoons are important for equipping preschool children with values. Therefore, it is necessary to be careful and sensitive about the cartoons that children watch. The aim of this research was to determine the values implicitly included in the preschool education program and to investigate the occurrence of these values in 6 cartoons Pırıl, Canım Kardeşim, Kare, Kukuli, Elif'in Düşleri and Maceracı Yüzgeçler. In the research, content analysis was used. Preschool education program and cartoons were analyzed descriptively. The data obtained through descriptive analysis were analysed and presented in detail. Random sampling was used while selecting 5 episodes of the cartoons investigated in the study. The study identified 27 values that were implicitly in the preschool education program. In these cartoons, the values of love, cooperation, kindness, being scientific and benevolence were covered most frequently and the values of aesthetics, empathy, knowing and protecting their rights, saving, self-control, courage and obeying the rules were covered less frequently. Values of self-respect, freedom and patriotism were not mentioned in any of the cartoons. It was found that most of the values that are implicitly included in preschool education program were covered in the cartoons analysed.

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INTRODUCTION

The way of thinking and behavior of the individuals in the society are considered important for the order and peace of the society. In this sense, human relations and cultural environment characteristics should be considered in the context of values (Özkan, 2011). Values are effective throughout the life of an individual in shaping his life and directing his behaviors (Yel & Aladağ, 2009). They are the criteria that an individual uses when making decisions (Lockwood, 2009) and are considered important for the individual or society (Friedman, Kahn, Borning & Huldtgren 2006). A value is a compass that individuals can draw a roadmap for, a touchstone with which they can find a place in society, a locomotive that directs their personality and nurtures their character, and a form of understanding that affects their happiness and decision-making processes (Aktepe & Gündüz, 2021). Values have a very important place in examining and explaining the behavior of individuals, and people make their choices based on their values while preferring one behavior to another (Sarı, 2005). Values represent a specific mode of conduct in terms of normative standards and an individual can learn the criteria that determine his or her behavior by noticing what is right and wrong according to the basic rules of the society (Beil, 2003; Rokeach 1973). In this sense, value can be defined as the basic principles and beliefs that guide and determine the individual's behavior (Halstead & Taylor, 2000; Ekşi &Katılmış 2011).

Values are unifying elements and cultural heritage of the society which are passed on to future generations. Values can even be thought as the character of the society. The values that develop and sustain the society should be acquired by school children (Aktepe & Gündüz, 2020). Thus, modern and effective schools and education are important for students to gain character and receive good education (Lickona, 1991).

Values education is also known as character education or moral education. It has positive impacts on students' moral and character development and social competencies in addition to their academic achievement at schools (Berkowitz, 2011). It is possible for children to learn the important values of the time from an early age and for new generations to grow up by learning these values with the effective values education planning. Thornberg (2006) states that it is important for students to participate actively in teaching and learning values and the formulation and implementation of the rules. Ulusoy & Dilmaç (2018) state that for a quality values education, values should be emphasized in schools, analysis should be supported with reasoning, responsibility should be shared equally in interaction with society and a democratic environment should be provided. Kirschenbaum (2000) argues that the teacher urges all students to reflect on and discuss ideas freely during reading, writing, thinking, speaking and discussion of the selected activities, and this helps clarify and develop values.

It can be argued that society's orientation towards the good and the right is only possible with a well-organized character and values education (Tüzel İşeri, 2019). Values education aims to teach children social and moral values and protect children before they

are harmed (Bhave, 2016). Regarding human and cultural development, values education points to the values that individuals should have to achieve the goal to be a good human being. Economic development plans, on the other hand, are tools to provide a quality life for good human beings (Öztürk Demirbaş, 2019). In order to develop the system of values education, all components of the system should be reviewed, parents should be involved and the system at schools should be strengthened and assimilated into the society (Pathania, 2011).

It is argued that children who attend a quality preschool program have enhanced language, mind, body, social and emotional development than non-attending peers due to the fact that the personalities of children begin to develop at an early age, and they have less problems in adapting to the environment and school (Hong, 2003). It is known that the preschool period is a critical time for all developmental domains (Oruç, Tecim & Özyürek, 2011). Therefore, the inclusion of the skills and values that contribute to student's character development in preschool education period is important for the well-being and development of both students and society.

Children usually watch cartoons on television in accordance with their personal needs and tastes (Turp Özdemir, 2020). Cartoons are tools that play an important role in the development of children's aesthetic and artistic values and in the acquisition of values (Zebrowski, 2017). It can be stated that cartoons can be used for educational purposes and are a source of information. Therefore, it is necessary to offer children an opportunity to watch the cartoons that reflect the values of the society in which they live (Cebeci & Demir, 2018).

Cartoons can be used as an important resource in helping children acquire values and social elements such as kindness, cooperation, respect for differences, and tolerance (Habib & Soliman, 2015). In addition, children's motivation towards the lessons and their interaction in the class can be improved by using cartoons in lessons (Kabooha, 2016). Discussing the events and characters in the cartoons can make the students think about the subject. In addition, the students' analysis and evaluation skills can be developed in a democratic environment by presenting different views, thus teaching the importance of respecting others (Aktepe, 2019).

The use of cartoons in the learning environment enables students to transfer knowledge and can increase their learning motivation, in-class interactions and interests (Rosen, 2009). Children prefer cartoons that match their age and characteristics and their interests differ based on their age and the economic level of their families but good voice, attractive visual effects and coloring affect children's interests in cartoons (Habib & Soliman, 2015).

It can be argued that it is important to choose and use cartoons especially in character and values education (Habib & Soliman, 2015). While cartoons entertain children, they can teach values, and their visual and auditory aspects can also attract children's attention.

Therefore, cartoons can have an important place in the character and values education of children. Within the scope of the research, six cartoon programs were investigated in terms of values education. In the study, the following cartoons were analysed: Pırıl, Canım Kardeşim (Dear Bro/Sis), Kare (Square), Kukuli, Elif'in Düşleri (Elif's dreams) and Maceracı Yüzgeçler (Adventurous Fins). Five episodes that were randomly selected from each cartoon were analysed.

Significance

Preschool education is a period which helps children gain self-confidence and affects their development positively by discovering their abilities, developmental characteristics, individual differences, and personalities from birth to the beginning of primary school (Zembat, 1994). Pre-school education provides rich stimuli and environment possibilities in accordance with the development levels of individuals and support their physical and social development (Gültekin Akduman, 2012). For this reason, it is important to determine the values which are taught implicitly in preschool education program and teachers should be aware of these values (Alkan, 2017; Balıkcı, 2015; Dirican & Dağlıoğlu, 2014). Teachers can organize the activities according to these values so that the values can be acquired by children in pre-school education (Akpınar & Özdaş, 2013; Aküzüm & Ergenekon, 2021; Sapsağlam & Ömeroğlu (2016).

Preschool education period is an important period when children are in the process of forming skills, values and character. During this period, they can learn through observation and then reflect on their behavior. Thus, they begin to acquire knowledge, skills and values by trying and imitating the behavior they take as role model. In addition, it is important to carry out teaching and providing skills and values in a planned manner and offer rich learning environments.

Personality development in the preschool period is shaped by family, environment and school. During this period, children often interact with television, which is a mass media tool. Therefore, learning takes place by modeling from television (Özkan & Yılmaz, 2016). This shows us that cartoons are an important part of the development of preschool children as the children learn by modelling and identifying himself or herself with a model while developing personality (Toksoy & Sapasağlam, 2019; Yorulmaz, 2013). Cartoons do not limit the imagination of children and present events and situations in a funny and colorful way. The child who takes the cartoon hero as a model can imitate his or her behavior. However, adopting them as role models can have negative effects on a child (Kalaycı, 2015).

In the preschool period, children show interest in and watch cartoons (Doğan & Göker, 2012; Yazıcı, Yaman Baydar & Kandır, 2019). They can learn by imitating many discourses, visuals, behavior and actions they see in cartoons. They can learn every behavior they watch or see. Thus, cartoons can be used to teach skill or value in preschool period. In the research, cartoons that have an important place for preschool children and the values and behavior in these cartoons were investigated and discussed. Determining the values in

the content of the cartoons watched by preschool children is important in terms of the value education of children. Therefore, it is expected that the research will contribute to the field.

Purpose

The aim of the study is to evaluate the values implicitly included in the Turkish preschool education program and investigate whether those values are covered in cartoons in terms of values education. Preschool period is a critical period in terms of values education. For this reason, values education should be on the targeted values and these values should be given deliberately in this period. The research aimed to answer the question "What are the values that are implicitly included in preschool education program?

Based on the aim of the study given above the study attempts to answer the following research questions:

1. Which values are implicitly included in preschool education program?

2. What is the frequency of the occurrence of the values implicitly included in the preschool education program in these cartoons?

3. In which episodes of the cartoons these values are covered?

4. What are the most frequently emphasized values in cartoons?

METHOD

Model of the Study

In the study, content analysis was used. Yıldırım & Şimşek (2016) state that content analysis includes the analysis of written materials or multiple documents containing information about the targeted phenomenon or phenomena in a certain period of time depending on the research question.

The data, both visual and written text, were collected from the episodes of the cartoons used as documents and each episode is regarded as a document. Within the framework of the values determined in the pre-school education program, these cartoons were described. Descriptive analysis was used in the analysis of the data obtained from the cartoons, and it was presented in detail.

Sample

The sample of the study consisted of the cartoons broadcast on TRT Çocuk and Minika Çocuk channels. Five episodes of the following cartoons were analysed: Pırıl, Canım Kardeşim, Kare, Kukuli, Elif'in Düşleri and Maceracı Yüzgeçler.

The cartoons Pırıl, Canım Kardeşim, Kare and Elif's Dreams were chosen because they were still broadcast on TRT Çocuk channel (Turkish Radio and Television Corporation), the

national public broadcaster, and all of them were domestic production. These cartoons were for pre-school and primary school children. Pırıl, its leading character, who sets role model behavior about responsibilities, is rich in values education and could attract children's attention (Güden Altmış & Altun, 2021). Canım Kardeşim Benim and Elif'in Düşleri were among the cartoons that children watch the most (Ünsal, 2019; Yıldız, 2016). The absence of physical violence in Canım Kardeşim (Yıldız, 2016), the frequent use of cognitive skills such as questioning in Elif'in Düşleri (Arslan, 2018) was one of the reasons to select these cartoons. Kare was also one of the cartoons that children watch the most. This cartoon was selected as it contains many elements on the cognitive, social, emotional, language, motor and self-care development areas (Cengiz, İlçi Küsmüş & Ramazan, 2020).

Kukuli and Maceracı Yüzgeçler were chosen because they were still broadcast on TRT Çocuk and Minika Çocuk, a private TV broadcaster, and they were domestic productions for pre-school and primary school children. Kukuli is a cartoon series presented in accordance with the subjects of EBA (Education Information Network) educational videos (Alpay & Okur, 2021). In its educational topic videos, topics related to the acquisition of concepts, cause-effect relationships, social rules, awareness of healthy and safe life in the pre-school education program were covered. Kukuli increases children's interest by incorporating the audio and visual components of motion graphics with education (Aydoğdu Torbacı, 2019). It was still broadcast on TRT Çocuk and had a large audience. Maceracı Yüzgeçler, a feature-length animated film produced in Turkey (Kozan, 2021), was selected for this study because it shows the İstanbul silhouette, mosque figure, Turkish flags and the use of Turkish characters (Kaya & Atuk, 2020).

Pırıl

Pırıl first aired in 2019 and was still shown on TRT Çocuk channel. It is a Turkish production and targets the pre-school and primary school students (Pırıl, 2020; Tarnet, 2020, cited in Duman & Koçtürk, 2021; Pırıl, 2021).

Canım Kardeşim

The cartoon, Canım Kardeşim, is a Turkish-made cartoon that aired on the TRT Çocuk, in 2012 and was still broadcast. Its target audience is pre-school children. It is about family life and tells about the daily events that take place at a family home including a mother, father, two sisters and a brother in a detached house with a garden (Özkar & Aytaş, 2021; Canım Kardeşim, 2021).

Kare

Kare includes elements on cognitive, linguistic, motor, social and emotional development (Cengiz, İlçi Küsmüş & Ramazan, 2020). It is aired on TRT Çocuk. Its target audience is pre-school children. Four friends try to find solutions to the problems of the society and help people (Kare, 2021).

Kukuli

This cartoon was broadcast on TRT Çocuk and targets pre-school children. Kukuli is a monkey who learn new things with his friends, Tinky and Minky (Kukuli, 2021).

Elif'in Düşleri

It is a Turkish-made cartoon that was aired on TRT Çocuk. Elif talks to vegetables and play with them while getting information about them. She learns the benefits of fruits and vegetables, delicious and healthy meals, vitamin values and much more from them (Elif'in Düşleri, 2021).

Maceracı Yüzgeçler

It is a Turkish-made cartoon and has been aired on the Minika Çocuk's channel. The major character is Biba who is a tiny mullet who is interested in books and reading. Like other children, he is happy to go to school and learn new things every day. Biba embarks on mysterious adventures by discovering new things every day with his cute friends Çupa, Tuti, Babu, Taka Hamsi and Mermaid Alesta who have different personalities (Maceracı Yüzgeçler, 2021).

Data Collection Tools

In the research, first, cartoon programs were reviewed and the relevant studies in the literature were examined. Then, the cartoons were determined for this study. The data in the research were limited to cartoons "Pırıl's 24th, 25th, 27th, 28th, 29th episodes; Canım Kardeşim's 15th, 16th, 28th, 51th, 78th episodes; Kare's 3rd, 37th, 41st, 49th, 50th episodes; Kukuli's 1st, 2nd, 3rd, 4th, 5th episodes; Elif'in Düşleri's 1st, 4th, 21st, 33rd, B episodes; Maceracı Yüzgeçler's 2nd, 9th, 17th, 20th, 27th episodes". Random sampling was used while selecting the 5 episodes of the cartoons selected for the research.

Data Collection Procedure and Data Analysis

First, the preschool education programs were review and the values implicitly included in the preschool education programs were determined. The program included "general aims of Turkish national education, the basic principles of pre-school education, the importance of pre-school education, social-emotional development gains, self-care skills, the introduction and start of the day sections of the preschool education program" and the data were analysed using content analysis method. In addition, in line with the purpose of the research, the presence of values in the cartoons Pırıl, Canım Kardeşim, Kare, Kukuli, Elif'in Düşleri and Maceracı Yüzgeçler were detected and the data were analyzed through content analysis. The analysis included checking the occurence of values, whether the cartoons include the values in the relevant episodes, how often they are emphasized and how they are included.

Preschool education program and the data obtained from the cartoons were analysed descriptively. The data obtained during the descriptive analysis were presented in detail.

Research Ethical Consent

In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics", which is the second part of the directive, have not been carried out.

Ethical review board name: Nevşehir Hacı Bektaş Veli University

Ethics Committee Date of ethics review decision: 25.10.2021

Ethics assessment document issue number: 306

RESULTS

1. What values are implicitly included in preschool education program published in 2013?

Identifying and revealing these values, which were implicitly included in the curriculum, is important due to the fact that it will shed light on value educators. Thus, the preschool education program (MEB, 2013) was analysed and the values that were implicitly conveyed were determined by examining the subject headings in Table 1. The values implicitly taught in 2013 preschool education program are presented in Table 1 below:

Table 1

Values that are implicitly included in the preschool education program

Sections in the education program	Values
General aims of the Turkish national education	Patriotism, keeping the culture alive, responsibility, being scientific, health, freedom, cooperation, respect
Basic principles of the pre-school education	Respect, tolerance, solidarity, cooperation, love, sharing, responsibility, benevolence, freedom, keeping the culture alive, self-respect, self-confidence and self-control
Significance of the pre-school education	Freedom, health, giving importance to family unity, love, respect
Social and affective outcomes	Empathy, respect, environmental awareness, saving, knowing and protecting their rights, freedom, keeping the culture alive, responsibility, greeting, obeying the rules, aesthetics, kindness, self-confidence, sharing, benevolence, self-respect
Acquisition of self-care skills	Cleanliness, health
Introduction of the pre-school education program	Cleanliness, health, freedom, keeping the culture alive, respect, responsibility, cooperation
Start of the day in the pre-school education program	Greetings, health, courage

Table 1 shows that the values determined in the 2013 preschool education program are, tolerance, responsibility, cooperation, love, respect, benevolence, solidarity, sharing, knowing and protecting the rights, empathy, freedom, greeting, self-confidence, self-respect, self-control, keeping culture alive, patriotism, family unity, health, aesthetics, cleanliness, being scientific, saving, environmental awareness, courage, obeying the rules and kindness.

Five episodes from six cartoons (Pırıl, Kare, Canım Kardeşim, Kukuli, Elif'in Düşleri and Maceracı Yüzgeçler) that appeal to preschool children were analysed according to 27 values in the preschool education program and the occurrence of these values in these cartoons were determined.

2. What is the frequency of the occurrance of values in cartoons that are implicitly included in the preschool education program?

Values were determined according to the event and situation displayed verbally or visually in the cartoon episodes. The frequency of the occurrence of the values in five episodes of six cartoons (Pırıl, Kare, Canım Kardeşim, Kukuli, Elif'in Düşleri and Maceracı Yüzgeçler) is presented in Table 2.

Table 2

Frequency of the occurence of values in the cartoon Pırıl

Values	Frequency (n)	Percentage (%)
Responsibility	3	13
Love	2	8.6
Tolerance	2	8.6
Benevolence	2	8.6
Solidarity	2	8.6
Self-confidences	2	8.6
Being scientific	2	8.6
Respect	1	4.3
Cooperation	1	4.3
Knowing and protecting the rights	1	4.3
Greeting	1	4.3
Self-control	1	4.3
Giving importance to family unity	1	4.3
Courage	1	4.3
Kindness	1	4.3
Total number of values 15	**23**	**100**

As can be seen in Table 2, in the five episodes of the Pırıl cartoon (Episodes 24, 25, 27, 28 and 29), there were a total of 15 values and they were mentioned 23 times. The most frequently occurring values were as follows: responsibility (3), love (2), tolerance (2), benevolence (2), solidarity (2), self-confidence (2) and being scientific (2). Less frequently appearing values were as follows: respect (1), cooperation (1), knowing and protecting one's rights (1), greeting (1), self-control (1), giving importance to family unity (1), courage (1) and kindness (1). Responsibility was the most frequently occurring value in the episodes of Pırıl cartoon.

Table 3

Frequency of the occurrence of values in Canım Kardeşim

Values	Frequency (n)	Percentage (%)
Giving importance to family unity	4	16.6
Respect	3	12.5
Sharing	3	12.5
Keeping the culture alive	3	12.5
Love	2	8.3
Health	2	8.3
Kindness	2	8.3
Cooperation	1	4.1
Tolerance	1	4.1
Solidarity	1	4.1
Cleaning	1	4.1
Being Scientific	1	4.1
Total number of values: 12	**24**	**100**

Table 3 shows that the five episodes of the Canım Kardeşim cartoon (episodes 15, 16, 28, 51 and 78) contained 12 values and they were mentioned 24 times. The most frequently appearing values were giving importance to family unity (4), respect (3), sharing (3), keeping the culture alive (3). Less frequently mentioned values were love (2), health (2), kindness (2), cooperation (1), tolerance (1), solidarity (1), cleanliness (1) and being scientific (1). The most frequent value in the episodes of Canım Kardeşim was the value of giving importance to family unity.

Table 4

Frequency of the occurrence of values in Kare

Values	Frequency (n)	Percentage (%)
Cooperation	5	19.2
Being scientific	5	19.2

Benevolence	3	11.5
Tolerance	2	7.7
Solidarity	2	7.7
Courage	2	7.7
Responsibility	1	3.8
Love	1	3.8
Respect	1	3.8
Sharing	1	3.8
Sef-confidence	1	3.8
Saving	1	3.8
Environmental awareness	1	3.8
Total number of values: 13	**26**	**100**

Table 4 shows that there were 13 values and they were mentioned 26 times in five episodes of Kare cartoon (episodes 3, 37, 41, 49 and 50). Most frequently appearing values were as follows: cooperation (5), being scientific (5) and cooperation (3). Less frequently mentioned values were tolerance (2), solidarity (2), courage (2), responsibility (1), love (1), respect (1), sharing (1), self-confidence (1) saving (1) and environmental awareness (1). The most frequently occurring values in the episodes of Kare cartoon were cooperation and being scientific.

Table 5

Frequency of the occurrence of values in Kukuli

Values	Frequency (n)	Percentage (%)
Love	5	22.7
Cooperation	3	13.6
Sharing	2	9
Cleanliness	2	9
Obeying the rules	2	9
Kindness	2	9
Responsibility	1	4.5
Benevolence	1	4.5
Solidarity	1	4.5
Empathy	1	4.5
Saving	1	4.5
Environmental awareness	1	4.5
Total number of vaues: 12	**22**	**100**

As can be seen in Table 5 there were 12 values and they were mentioned 22 times in five episodes of the Kukuli cartoon (episodes 1, 2, 3, 4 and 5). Most frequently mentioned ones were love (5), cooperation (3), sharing (2), cleanliness (2), obeying the rules (2) and kindness (2). Less frequently mentioned values were responsibility (1), benevolence (1), solidarity (1), empathy (1), savings (1) and environmental awareness (1). In the episodes of Kukuli cartoon, the most frequently occurring value was love.

Table 6

Frequency of the occurrence of values in Elif'in Düşleri

Values	Frequency (n)	Percentage (%)
Love	5	9
Greeting	5	9
Giving importance to family unity	5	9
Health	5	9
Kindness	5	9
Being scientific	4	7.2
Responsibility	3	5.4
Respect	3	5.4
Cooperation	3	5.4
Benevolence	3	5.4
Tolerance	2	3.6
Solidarity	2	3.6
Sharing	2	3.6
Confidence	2	3.6
Self-control	1	1.8
Keeping the culture alive	1	1.8
Cleaning	1	1.8
Environmental awareness	1	1.8
Obeying the rules	1	1.8
Courage	1	1.8
Total number of values: 20	**55**	**100**

Table 6 shows that in the five episodes of the Elif'in Düşleri cartoon (episodes 1, 4, 21, 33 and B), there were 20 values covered and they were mentioned 55 times. Most frequently mentioned values were love (5), greeting (5), giving importance to family unity

(5), health (5), kindness (5) and being scientific (4). Less frequently appearing values were responsibility (3), respect (3), cooperation (3), benevolence (3), tolerance (2), solidarity (2), sharing (2), self-confidence (2), self-control (1), keeping the culture alive (1), cleanliness (1), environmental awareness (1), courage (1) and following the rules (1). The most frequently mentioned values in Elif'in Düşleri were love, greeting, giving importance to family unity, health and kindness.

Table 7

Frequency of the occurrence of values in Maceracı Yüzgeçler

Values	Frequency (n)	Percentage (%)
Love	5	11.1
Benevolence	5	11.1
Greeting	5	11.1
Kindness	5	11.1
Cooperation	4	8.9
Responsibility	3	6.6
Tolerance	2	4.4
Solidarity	2	4.4
Sharing	2	4.4
Cleaning	2	4.4
Being scientific	2	4.4
Environmental awareness	2	4.4
Knowing and protecting your rights	1	2.2
Confidence	1	2.2
Self-control	1	2.2
Keeping your culture alive	1	2.2
Aesthetic	1	2.2
Obeying the rules	1	2.2
Total number of values: 18	**45**	**100**

As can be seen in Table 7 there were 18 values covered and they were mentioned 22 times in five episodes of Maceracı Yüzgeçler (episodes of 2, 9, 17, 20 and 27). Most frequently appearing values were love (5), benevolence (5), greeting (5), kindness (5) and cooperation (4). Less frequently occuring values were responsibility (3), tolerance (2), solidarity (2), sharing (2), cleanliness (2), being scientific (2) environment (2), knowing and protecting one's rights (1), self-confidence (1), self-control (1), keeping the culture alive (1), aesthetics

(1) and obeying the rules (1). In the episodes of Maceracı Yüzgeçler, the most frequently appearing values were love, benevolence, greeting and kindness.

3. In which episodes of the cartoons these values are covered?

Table 8 presents the episodes of the cartoons in which the values were covered:

Table 8

Episodes of the cartoons in which the values were covered

Values	Pırıl	Canım Kardeşim	Kare	Kukuli	Maceracı Yüzgeçler	Elif'in Düşleri
Responsibility	24.25.27.	-	50.	4.	2.20.26.	4.33.B.
Love	28.29.	28.78.	37.	1.2.3.4.5.	2.9.17.20.26	1.4.21.33.B.
Respect	27.	15.16.28.	37.	-	-	21.33.B.
Cooperation	28.	28.	3.37.41.49.50.	2.4.5.	2.9.17.20.	21.33.B.
Tolerance	25.29.	16.	3.50.	-	2.17.	33.B.
Benevolence	25.28	-	3.37.49.	4.	2.9.17.20.26.	1.21.B.
Solidarity	27.28.	28.	37.41.	4.	2.9.	21.33.
Sharing		16.51.78.	3.	1.2.	9.26.	33.B.
Knowing and protecting rights	28.	-	-	-	26.	-
Empathy	-	-	-	4.	-	-
Greeting	24.	-	-	-	2.9.17.20.26.	1.4.21.33.B.
Self-confidence	24.28.	-	50.	-	17.	21.33.
Self-control	27.	-	-	-	20.	4.
Keeping the culture alive	-	15.28.51.	-	-	9.	B.
Giving importance to the family unity	29.	15.16.28.78.	-	-	--	1.4.21.33.B.
Health	-	15.51.	-	-	-	1.4.21.33.B.
Being scientific	27.28.	16.	3.37.41.49.50.	-	9.20.	4.21.33.B.
Aesthetics	-	-	-	-	20.	-
Cleanliness		15.		1.4.	9.20.	4.
Saving	-	-	3.	4.	-	-

Environmental awareness	-	-	37.	4.	9.20.	4.
Courage	27.	-	3.50.	-	--	33.
Obeying the rules	-	-	-	1.2	9.	33.
Kindness	25.	28.51.	-	1. 2.	2.9.17.20.26.	1.4.21.33.B.
Total number of sections	5	5	5	5	5	5

As seen in Table 8 there was a total of 24 values, including values such as responsibility, cooperation, respect, tolerance, sharing, love, solidarity, knowing and protecting their rights, empathy, greeting, self-confidence, self-control, keeping the culture alive, giving importance to family unity, health, science, aesthetics, cleanliness, saving, environmental awareness, courage, obeying the rules and kindness. There were differences among the cartoons in terms of the occurrence of these values. There was no cartoon which covered all the values implicitly included in the pre-school education program.

4. What are the most frequently occurring values covered in cartoons?

Table 9 indicates the ranking of the values based on their frequency of occurrence in the cartoons analysed.

Table 9

Frequency of the occurrence of values in all cartoons analysed

Values	Frequency (n)	Percentage (%)
Love	20	10.2
Cooperation	17	8.7
Kindness	15	7.7
Being scientific	14	7.1
Benevolence	14	7.1
Responsibility	11	5.6
Greeting	11	5.6
Solidarity	10	5.1
Sharing	10	5.1
Giving importance to the family unity	10	5.1
Tolerance	9	4.6

Respect	8	4.1
Health	7	3.6
Self-confidence	6	3
Cleanliness	6	3
Keeping the culture alive	5	2.5
Environmental awareness	5	2.5
Courage	4	2
Following the rules	4	2
Self-control	3	1.5
Knowing and protecting the rights	2	1
Saving	2	1
Empathy	1	0.5
Aesthetic	1	0.5
Total number of values: 24	**195**	**100**

Table 9 indicates that there were a total of 24 values in the episodes of the cartoons and they were mentioned 195 times. The most frequently occurring values were love (19), cooperation (17), kindness (15), being scientific (14) and benevolence (13). These are followed by responsibility (11), greeting (11) solidarity (10), sharing (10), giving importance to family unity (10), tolerance (9), respect (8), health (7), cleanliness (6), self-confidence (6), environmental awareness (5) and keeping culture alive (5). The least mentioned values in the cartoons were aesthetics (1), empathy (1), knowing and protecting the rights (2), saving (2), self-control (3), courage (4) and obeying the rules (4). The values that were not covered in the cartoons were self-respect, freedom and patriotism.

DISCUSSION

When the studies in the field related to the pre-school education program and values are reviewed, 74.6% of the teachers suggest that the preschool education program should be improved and enriched in terms of values education, regarding the competences in value education in preschool (Fidan Dal, 2018). This study corroborates the findings of previous research. It is seen that the values of responsibility, respect, solidarity, trust and love are given a lot of place in the preschool education program (Aral & Kadan, 2018). It can be argued that results regarding the values of love, cooperation and cooperation found mostly covered in cartoons selected for this study is in parallel with the literature.

When the studies on cartoons are reviewed, Sevim (2013) found that the value of benevolence is the most emphasized value in the cartoons in his research, which investigated six cartoons in terms of values. Giving much space to the value of benevolence is similar to the results of the research. Sadioğlu et al. (2018) investigated the episodes of the cartoon called Rafadan Tayfa broadcast in TRT Çocuk in terms of values, and found that benevolence, solidarity and being scientific were mostly covered values, while justice, honesty, hospitality, tolerance and aesthetic values were less covered. It is similar to the results of this research that the values of being scientific and cooperation occurred more and the value of aesthetic occurred less. In the study conducted by Karakuş (2015) on the cartoon Niloya, it was found that mostly covered values were love, tolerance, sensitivity and kindness. The findings of this study is not in line with Karakuş's study. In the study of Toksoy and Sapasağlam (2019) which investigated 5 different cartoons in terms of the values specified in the UNESCO-sponsored Living Values Education Program (LVEP), they found that cooperation and happiness were mostly covered values and the values of simplicity and peace were not included in any cartoons. Although it is not similar to the results of this research, partial similarity was found as the results regarding the value of cooperation is one of the most appearing values in cartoons. Turp Özdemir (2020), found the values of responsibility and self-control as the most, and patriotism and honesty as the least appearing values in the cartoons. The findings of this study challenges the findings of Turp Özdemir.

Şahin (2019) found that the less frequently covered values were loyalty, heroism, cleanliness, honesty, loyalty, equality and patriotism and suggested that script should also include values of freedom and flag. This study partially confirms the findings of his study as freedom and patriotism were not covered in the cartoons. It is a concept that cares about the concepts of freedom, democracy and human rights. Patriotism, on the other hand, is a basic concept that creates awareness that supports national feelings. For this reason, it is considered important to include these two values in cartoons. Ünsal (2019) found the values of respect, kindness, love and cooperation in the cartoons. This study corroborates the findings of Ünsal's study regarding the frequency of the values of love, kindness, cooperation. These values, in essence, express human values. For this reason, they are the basic elements of being human and they should be included in cartoons.

In the Pırıl cartoon 15 values appeared. The most frequently covered values among these were kindness, aesthetics and responsibility (Güden Altmış & Altun, 2021). It is in line with the findings of this research. Turkish life style, Turkish cuisine, folk music, folk dances, helping elders, Turkish family structure, food culture and table manners, belief, family, friendship, fraternity, national moral values, solidarity, love of animals, respect for elders, among many, are presented in an educational and entertaining way for children (Demir, 2021; Özkar & Aytaş, 2021). It can be argued that this is in parallel with the results of this research. In Kare cartoon, while the acquisitions for the cognitive development field were mostly included, a variety of acquisitions were included in social emotional development,

and the acquisition of showing one's emotions in appropriate ways was mostly covered (Cengiz, İlçi Küsmüş & Ramazan, 2020). In the cartoon Elif'in Düşleri, physical, psychological and verbal violence elements were not found. Horror elements with sound, light and surrealistic features were not found (Üstündağ & Şenol, 2021). This finding is in line with the findings of this research.

LIMITATIONS AND RECOMMENDATIONS

In the study, five episodes of each cartoon were investigated. Cartoons that were not included in this study can be further studied in terms of values education. It is recommended that the values of freedom, self-respect and patriotism, which are not included in the cartoons examined within the scope of the research, could be included in the cartoons. Cartoons that educators and parents find useful for children can be classified according to their characteristics by studying them in terms of values. If it is known which content and values are included in which cartoons, it can be a resource for value educators. It can be used as a material in educational activities at home and school. Awareness raising can be done by organizing educational activities like seminars and conferences on cartoons for teachers and parents. Furthermore, seminars and conferences can be organized by subject matter experts on choosing the right cartoons for teachers and parents. In addition, including values in the curriculum overtly and directly can facilitate the work of value educators.

CONCLUSION

As a result of this research, we determined the values that were implicitly included in the preschool education curriculum. We also determined the occurence of these values in the cartoons, the cartoon episodes they appeared, the most frequently appearing values and the values that were not included in the cartoons at all.

In the study, first the values implicitly included in the preschool education program published in 2013 were determined. Patriotism, keeping the culture alive, responsibility, being scientific, health, freedom, cooperation and respect values were included under the section of the general aims of the Turkish national education. Respect, tolerance, solidarity, cooperation, love, sharing, responsibility, benevolence, freedom, keeping the culture alive, self-respect, self-confidence and self-control values were related to the basic principles of the pre-school education. The section of the significance of the pre-school education includes the values of freedom, health, giving importance to family unity, love and respect. The social and affective outcomes section included empathy, respect, environmental awareness, saving, knowing and protecting their rights, freedom, keeping the culture alive, responsibility, greeting, obeying the rules, aesthetics, kindness, self-confidence, sharing, help and self-respect. The self-care skills section included two values, cleanliness and health. The values of greetings, health and encouraging were in the section of starting the day.

The occurrence of the values implicitly included in the pre-school education program in the cartoons was analysed and it was found that out of 27 values given in the pre-school education program, 24 values were covered in the cartoons. These values are tolerance, responsibility, benevolence, love, respect, cooperation, solidarity, sharing, knowing and protecting the rights, empathy, greeting, self-confidence, self-control, keeping the culture alive, giving importance to family unity, health, aesthetics, cleanliness, being scientific, saving, environmental awareness, courage, obeying the rules and kindness. However, the values of freedom, self-respect and patriotism could not be detected in these cartoons. The fact that these values did not appear in the cartoons could be regarded as a deficiency in terms of human rights, awareness of democracy, patriotism and self-respect.

The episodes of the cartoons which included the values were analysed. Accordingly, in five episodes of the Pırıl cartoon (episodes 24, 25, 27, 28 and 29) a total of 15 values were covered: responsibility, love, tolerance, benevolence, solidarity, self-confidence, being scientific, respect, cooperation, knowing and protecting one's rights, greeting, self-control, giving importance to family unity, courage and kindness. In the 15th, 16th, 28th, 51st and 78th episodes of the Canım Kardeşim, 12 values were covered: love, respect, cooperation, tolerance, solidarity, sharing, keeping the culture alive, giving importance to family unity, health, cleanliness, scientific and kindness. The most frequently appearing value in this cartoon was the value of giving importance to family unity. In the episodes of 3, 37, 41, 49 and 51 of Kare cartoon, 13 values were found: tolerance, responsibility, cooperation, love, respect, benevolence, solidarity, sharing, self-confidence, being scientific, saving, environment and courage. The most frequently occuring values were cooperation and being scientific. In the episodes of 1, 2, 3, 4 and 5 of Kukuli cartoon, twelve values were detected, responsibility, love, cooperation, benevolence, solidarity, sharing, empathy, cleanliness, saving, environment, obeying the rules and kindness. The value of love was the most frequently mentioned value in Kukuli. In the episodes of 1, 4, 21, 33 and B of Elif'in Düşleri cartoon, there were 20 values, including tolerance, responsibility, cooperation, love, respect, benevolence, sharing solidarity, greetings, self-confidence, self-control, keeping the culture alive, giving importance to family unity, health, cleanliness, being scientific, environmental awareness, courage, obeying the rules and kindness. The values of love, greeting, giving importance to family unity, health and kindness were the most mentioned values in Elif'in Düşleri. In the episodes of 2, 9, 17, 20 and 27 of Maceracı Yüzgeçler there were a total of 18 values, including responsibility, love, cooperation, tolerance, benevolence, solidarity, sharing, knowing and protecting their rights, greeting, self-confidence, self-control, keeping the culture alive, cleanliness, being scientific, aesthetics, environment, obeying the rules and kindness. The values of love, cooperation, greeting and kindness were the most frequently occuring values in the episodes of Maceracı Yüzgeçler.

The most frequently emphasized values in the cartoons were analysed. The findings of the study indicate that there was a total of 24 values covered and they were mentioned 195 times 30 episodes of six cartoons. Of these values, 15 values were covered and they were

mentioned 23 times Pırıl, 12 values were covered and they were mentioned 24 times in Canım Kardeşim, 15 values were covered and they were mentioned 23 times in Kare, 12 values were covered and they were mentioned 22 times in Kukuli, 20 values were covered and they were mentioned 55 times in Elif'in Düşleri, 18 values were covered and they were mentioned 45 times in Maceracı Yüzgeçler. In this sense, it can be said that these two cartoons included more values.

The most frequently occurring values in these cartoons were love (19), cooperation (17), kindness (15), being scientific (14) and benevolence (13). These values were followed by responsibility (11), greeting (11), sharing (10), solidarity (10) and giving importance to family unity (10), tolerance (9), respect (8), health (7), cleanliness (6), self-confidence (6), environmental awareness (5) and keeping the culture alive (5). Less frequently covered values in the cartoons were aesthetics (1), empathy (1), knowing and protecting the rights (2), saving (2), self-control (3), courage (4) and obeying the rules (4). It was found that the values of freedom, self-respect and patriotism were not covered in any of the cartoon episodes.

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Appendix A: Cartoons in the study

Pırıl

The plot of the episodes taken from this cartoon can be summarised as follows:

Episode 24 (Everything is in Your Brain): Pırıl and Uzay learn to construct patterns while making a necklace and believe that this necklace will bring them luck.

Episode 25 (Uzay's addition machine): Pırıl teaches addition to her brother Uzay using an addition machine and shares her experience with the class.

Episode 27 (An encrypted diary): It is about the adventures of Uzay and Mert after they find Pırıl's diary and try to crack the password to open it.

Episode 28 (What happened to Uzay's ball?): Uzay loses his ball and he looks for it.

Episode 29 (Pırıl's birthday cake): Pırıl becomes sad when no one remembers her birthday and then becomes happy when she discovers that a surprise party has been organised for her.

Canım Kardeşim

The plot of the episodes taken from this cartoon can be summarised as follows:

Episode 15 (Ha Ha Hapşu): After Müge gets sick, she recovers thanks to useful plants at home and they learn a song of Barış Manço, a Turkish rock musician.

Episode 16 (If Life Was a Computer Game): Müge and her sister learn computer games and imagine the world as a computer game.

Episode 28 (A new sibling): Müge and Mine are happy that they will have a new sibling and they welcome their new sibling by writing a letter for her and decorating the house.

Episode 51 (It is Eid today): Müge and her family experience the joy of Eid at home and learn its meaning and value.

Episode 78 (I am Offended with You): Müge and Mine are offended by each other because of jealousy and then they reconcile.

Kare

The plot of the episodes taken from this cartoon can be summarised as follows:

Episode 3 (Cookie House): Penguin playing with the lawn irrigation system asks Kare for help after the water is gone.

Episode 37 (Waterfall): After the disappearance of Mr. Kürek Çeken, Kare goes looking for him.

Episode 41 (Cave): The episode gives information about the caves. The cave is one of the natural geographical formations of our world, it is not man-made, the name of the cave is repeated with visuals, the general characteristics of the cave are conveyed with the information obtained from Vızvız.

Episode 49 (Fossil): Finding out that the bones that Mr. Yontunç thinks as the fishbone statue are ordinary fishbones, they look for the fossils.

Episode 50 (Glass Mountain): It is about Kare's investigations of the volcano that is about to erupt and their research on the volcano.

Kukuli

The plot of the episodes taken from this cartoon can be summarised as follows:

Episode 1 (More): Minky wants more everytime. More cakes, bigger bananas, more dance. Tinky tries to teach Minky a lesson about the fact that it is not always good to want more.

Episode 2 (Sharing is caring): Kukuli hides the pastry he finds in the refrigerator and dreams of eating it alone, but his friends give the message that even if it is very delicious, we should eat it together. Kukuli also realizes that it is much better to share it and shares the pastry with his friends.

Episode 3 (Teammates): Tinky, Minky and their friends get bored and decide to play volleyball. Minky tries to show himself in the team. The team loses the ball after his attempts. His friends remind him of the importance of team play and solidarity, and Minky listens to them and he plays in a much more enjoyable match.

Episode 4 (Recycling): Minky does not pay attention to where he throws the garbage. His friends collect the garbage he throws everywhere and keep them in the garage. By empathizing with Minky, they show how garbage takes up space in nature and how it harms living things. They show that they can protect nature by throwing garbage into recycling bins.

Episode 5 (Unclaimed): Tinky tells his friends that they should not take the things they find on the ground, these may belong to someone else. However, he takes the stray dog he finds on his way home. To find the owner of this mischievous dog, his brother and friends put up notice everywhere to find the owner.

Elif'in Düşleri

The plot of the episodes taken from this cartoon can be summarised as follows:

Episode 1 (Eggplant in the pole): Elif helps her grandfather, who is a greengrocer. In this episode, she dreams and talks to fruits and vegetables. In her dreams she talks to eggplants and goes to the south pole near penguins.

Episode 4 (Smiling banana): Elif is having a bad day and does not eat anything. Her mother suggests her drinking milk with banana and honey. Elif goes to her grandfather's grocery store to buy bananas, and she dreams talking with the banana. She has a journey into the world of bananas.

Episode 21 (Beauty expert): Doctor Kemal returns to his neighborhood. Münevver Teyze asks him for advice in order not to grow old when she meets him in front of the greengrocer. Doctor Kemal recommends her to eat cucumber. Münevver Teyze does not like his suggestions. However, in Elif's dreams it is shown how useful cucumber is.

Episode 33 (Plane): Selim wants to be a pilot in future in his dream. He excitedly tells Elif about his dream. Hearing Selim's dream, Elif gives Selim a paper airplane she has made. When Selim cannot fly the plane, his self-confidence is lost. Münevver Teyze and Elif support Selim to regain his self-confidence.

Section B (Eid): While Elif is helping her mother with the preparations for the Eid, her father comes with a package in her hand. Elif is very happy when she sees the new dress for the Eid. She wakes up excitedly on the morning of the feast. Eid prayer is performed on the morning, Eid is celebrated and they have a nice breakfast together. In tables for the cartoon Elif's dreams "B." abbreviation stands for this Eid part.

Maceracı Yüzgeçler

The plot of the episodes taken from this cartoon can be summarised as follows:

Episode 2: Babu participates in the Great Invention of the Bosphorus competition and asks his friend, Biba, for help for the introduction of his project. However, Babu's text falls into the sea. Çupa and Tuti decide to help Biba and they attempt to save the paper together.

Episode 9: Taka Hamsi gets a seed in his throat and he coughs so much that he suddenly finds himself in a water bottle. Maceracı Yüzgeçler's mission is not only to save Hamsi from the bottle, but also to collect the trash around the bottle.

Episode 17: For Biba everything is very good. However, he messes things up while trying to help his friends. Biba feels himself bad and he wants to be alone. Meanwhile, Alesta goes to the Maiden's Tower and is trapped in the secret room there. They need Biba's assistance.

Episode 20: It is a special day for Bosfori. Today there is seaweed puff in the patisserie and Çupa wants to go and eat it as soon as possible. But first they have to go to school. Biba reminds him that he should also clean the garden at school today.

Episode 27: Biba promises to meet many friends in one day. He loves Tuti, Babu, Çupa and Taka Hamsi very much and he does not want to make upset any of them. But it is not possible for him to be more than one place at the same time. It messes things up when he doesn't refuse any of them.

Biographical notes:

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Research

A Comparison of Metaphors Created by Teachers about eTwinning in Turkey and Abroad

Celalettin Çelebi [1]   Fatih Yılmaz [2]

Abstract:

It is highly important that teachers have the necessary professional knowledge, skills and attitudes for the efficiency of the teaching and learning process, which has an important role in gaining the required qualifications to individuals. One of the educational platforms that can be used for teachers to develop both their personal and professional skills is the eTwinning platform. It offers various opportunities for both teachers and students. Literature review has shown that the number of researches on eTwinning, which is used by more and more teachers in Turkey, is insufficient in number. The participants of this research, which aims to compare metaphors created by teachers in Turkey and abroad, consist of 224 teachers. In the study, the content analysis method has been adopted, and the data have been collected through a fixed form questionnaire. According to the results of the research, it has been found out that eTwinning projects have mostly been carried out by teachers working at primary schools. The metaphors produced by teachers for eTwinning projects have been grouped under 8 different categories. Lastly, teachers also use various tools while carrying out their projects.

Keywords:
Metaphors, online teaching, online learning, eTwinning, teachers

Citation:
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INTRODUCTION

The use of technology in education is in the spotlight in recent decades and massive advances in technology have considerably changed the quality of learning and the way of teaching. E-learning approaches and methods can be examples to these advances. One of the best examples to e-learning activities can be eTwinning projects which first started as an internet platform providing activities from shared projects for schools at national and international levels, collaborative spaces and professional development opportunities for teachers (Galvin, 2006; Güzel et al., 2010; Kearney & Velázquez, 2015).

eTwinning was launched on the 14th of January, 2005, in the beginning, to enable partnerships between preuniversity education institutions in Europe. In time, the portal "www.etwinning.net" became a community of schools in Europe (Akıncı, 2018; Gençtürk Erdem, 2021; Velea, 2011). Turkey has become a part of this programme on the 18th of February, 2009, and since then, eTwinning projects are quite popular among Turkish teachers. Statistics, also, confirm this popularity among the teachers. In Turkey, as of June 2021, the number of schools enrolled in the project is around 52000, the number of teachers enrolled is around 285000, and the number of completed projects is around 50000, and these numbers are increasing each and every day (Erasmus+, n.d.).

Moreover, the eTwinning portal is highly useful for its users. For instance, the participants of the portal can share educational materials by means of portal tools. Since an eTwinning project is completely out of charge, every school, every teacher and every student can sign up the portal. All the tools in the portal are accessible for its users. The use of tools is not limited to the tools available on the portal as well. Users can also make use of their own tools.

An eTwinning project can start anytime during the year. Although there are no limits regarding the duration of a project, they usually last between 6 to 12 months, and if necessary, they can last even longer (Ministry of National Education, n.d.a). The projects can be carried out with at least two partners from two different schools, but the number of partners may increase as well. To improve the project, partners discuss the stages of the project in the course of the time (Gajek, 2010; Gençtürk Erdem, 2021).

In essence, eTwinning projects include school partnerships, and online activities between partners (Akdemir, 2017; Başaran et al., 2020). Additionally, some other goals of eTwinning are to involve teachers and students in new learning and teaching activities and the creation of different educational out products involving new educational technologies and cooperative development. Moreover, in the long term, it aims to improve teachers' and students' ability to use digital technologies, their communicative skills, knowledge and intercultural dialogue (Velea, 2011, p. 142).

Some contributions of eTwinning projects to teachers can be; having an idea about educational practices in different national schools or schools in Europe, getting a chance to

improve their foreign language, using information technologies during the courses, being able to make the courses fun and professional self-improvement. The projects also contribute to the students as well. Some of the contributions can be; getting motivated for the course, getting to know different cultures, having a chance to practice the foreign language, using technology for educational purposes and being more participant in the courses (Ministry of National Education, n.d.b).

In schools where eTwinning projects are carried out, teachers, principals and all the school members are encouraged to share good practices in order to improve teaching and learning experiences (Licht et al., 2020, p. 6). That's to say, the projects give the partners an opportunity to learn from each other. To sum up, eTwinning projects, going beyond the borders, can be highly beneficial for teachers, school principals and students who want to share their ideas and experiences with the project partners to enhance their teaching methods and getting aware of new approaches in education (Avcı, 2021; Gilleran, 2019).

On the other hand, recently, there has been an explosion in the number of studies dealing with metaphors. A significant part of researches carried on metaphors suggest that metaphors are not just figures of speech, but they are specific mental mappings that influence how people think, and imagine in everyday life (Gibbs, 1999, p. 309). According to studies, the word metaphor comes from the Greek word "metapherein". Meta means "to change" and phrein means "to bear". Using the metaphor as a "change bearing" agent helps people adapt what they know into new contexts (Levine, 2005, p. 172).

Metaphors, involve an active, partial transformation of one kind of thing that is the topic, under the guidance of another kind of thing, the vehicle (Dent-Read & Szokolszky, 1993, p. 227). In different disciplines there may be different definitions of a metaphor. However, it can simply be defined as "an implicit comparison, one which calls attention to similarities between two things by speaking of one thing as if it were another" (Carlson, 2001, p. 49). In addition to being freedom for the narrator (Ülker, 2018, p. 1) metaphors connote rich images of the things being described. They can clearly deliver just a single idea or a set of experiences. Today metaphors are accepted as highly accurate descriptions of the speaker's perceptions. When we talk about our problems, our emotions, our desires, our relationships, we are likely to use metaphors to describe how deep and complex they are (Tompkins & Lawley, 2002).

Purpose of the research

This research aims to determine and compare the perceptions of teachers in Turkey and abroad about eTwinning through metaphors, and with this aim, it seeks answers to the following questions:

1. Which metaphors do teachers in Turkey and abroad use to explain their perceptions towards eTwinning?

2. Under which conceptual categories can the metaphors that teachers in Turkey and abroad developed for eTwinning be categorized in terms of common features?

3. How is the distribution of metaphors in the conceptual categories created?

4. How do conceptual categories in Turkey and abroad differ?

METHOD

This research aims to compare the metaphors about eTwinning created by teachers working for the Ministry of National Education in Turkey and teachers working abroad. Phenomenology has been adopted as a qualitative research design. Phenomenology is the study of experiences from the reflections of the experiencer. The experiencer actively conveys his/her experience about the phenomenon and describes it (Costantino, 2008, p. 116). Data sources in a phenomenological design must be the people who have already experienced the phenomenon in question. For this reason, the participants of this study are teachers who have already taken part in an eTwinning project.

On the other hand, metaphors are not simple ornaments, that's to say, they are not just decorative words, but they are everywhere in the language. They cannot be simply replaced by literal statements (Zhou & Heineken, 2009, p. 25). Therefore, it can be stated that metaphors pervade our lives. Actually, metaphors cannot give us the exact solutions to the problems we face in life, but they definitely help us become aware of various new points of view (Guilherme & Freitas, 2018, p. 947). Metaphors can lead people think and interpret things or events in different ways. Thus, in this research, teacher perceptions of eTwinning in Turkey and abroad, the meanings they attribute to it, and the expressions they put forward as the reasons for creating and using those metaphors have been investigated.

Participants

Sampling is thought to have a critical role on the quality of any research. In this research purposeful sampling, also known as the judgement sampling, method has been adopted. This is the most common sampling technique in qualitative researches. In this technique the researcher selects the most productive sample to answer the research questions (Marshall, 1996, p. 523). Additionally, researchers also prefer purposeful sampling to broaden the scope of situations investigated in detail (Bradley, 1993, p. 438). Participants of this research are teachers working at state schools in Turkey and teachers working abroad. They have already taken part in an eTwinning project before and answered the research form voluntarily. Table 1 below shows the demographic information of the participants.

Table 1

Demographic information of participants

		Teachers in Turkey	Teachers Abroad
Gender	Male	27	13
	Female	87	97
Type of School Currently Served	Pre-School	16	9
	Primary School	61	44
	Middle School	16	23
	High School	21	34
Job Seniority	1-5 Years	1	9
	6-10 Years	20	6
	11-20 Years	69	34
	20 Years or More	24	58
	Total	114	110
	Participants in Total	224	

Sample size is one of the important questions of a researcher. In order to get reliable results, the researcher must determine the appropriate sample size or number of participants for the research (Yılmaz, 2019, p. 8-9). Some researchers think that sample size is not a big matter for qualitative researches since it does not require statistical generalizations as in quantitative researches (Boddy, 2016, p. 427). Considering the minimum sample size in qualitative researches Morse (1994) suggests that phenomenological researches aiming to distinguish participant experiences need about six participants, ethnographies and grounded theory studies need minimum participants of 30 to 50, and qualitative ethological studies need minimum participants of 100 to 200 (Sandelowski, 1995, p. 182). Taking the minimum sample size requirements in qualitative studies it is clear that participant number of this research meets the requirements above.

Data Collection

Data collection has been carried out through google forms by means of a semi-structured interview form. In the questionnaire, the participants of the study have been asked to complete the phrases, "eTwinning is ……" "because ……". In the interview form, the first phrase requires the participants to make an analogy and the second phrase requires them to express the reason for their analogy. Since the form allows no missing values, all of the participants completed the form thoroughly.

Analysis of Data

Choosing the appropriate analysis method is always crucial for any research. In the analysis of the data, qualitative content analysis, one of the most widely preferred

techniques, has been adopted. Although there are no universal rules about how to use content analysis (Cavanagh, 1997, p. 8), it briefly aims to classify the research data into categories representing similar meanings (Moretti et al., 2011, p. 420). However, content analysis is more than counting words and analysing research data with the aim of classification. The goal of the technique is "to provide knowledge and understanding of the phenomenon under study" (Hsieh & Shannon, 2005, p. 1278). First, in the analysis of data, participant answers to the phrases "eTwinning is …because …" have been considered as metaphors. Then, similar expressions have been grouped and nodes have been formed. In the light of the nodes, categories have been created.

In order to find out the reliability of the research, a consistency analysis has also been done. For that purpose, both researchers took part in this stage. Using the research data, researchers created the conceptual categories. Then the researchers consulted an expert on qualitative studies. They asked the expert match the metaphors with the conceptual categories. Miles and Huberman, (1994) offers that reliability analysis in qualitative studies can be calculated by (Reliability = Number of agreements / Number of agreements + disagreements) formula (O'Connor & Joffe, 2020, p. 8). It is recommended that interrater agreement should not be less than 90% (Leclerc & Dassa, 2010, p. 83). According to this formula, coding reliability has been found to be %91 and finally, 8 number of categories have come out. These are "Different View Point, Exploratory View, Cooperation, Education, Values, Analytical View, Emotionality, and Negative View".

Ethical Issues

The research data have been collected, anonymously, by means of Google forms. The first part of the data collection tool had a consent form and informed the participants about the study.

Additionally, the researchers followed all the rules stated in "Higher Education Institutions Scientific Research and Publication Ethics Directive" and they avoided all the actions stated under the title "Actions against Scientific Research and Publication Ethics", which is the second part of the directive aforementioned. Detailed information regarding the ethical documents is below.

Ethical review board name: Necmettin Erbakan University, Social Science Researches Ethics Committee

Date of ethics review decision: 21/05/2021

Ethics assessment document issue number: 2021/311

Findings

In this part of the study, the findings of the research, metaphors for "eTwinning Projects" produced by teachers in Turkey and abroad, have been presented in tables. Table 2 shows the distribution of metaphors for eTwinning projects.

Table 2:

Metaphors for eTwinning projects produced by the participants

	Teachers Abroad				Teachers in Turkey		
SN	Metaphors	-f-	%	SN	Metaphors	-f-	%
1	Window	7	6,35	1	Sharing	10	8,87
2	Bridge	5	4,54	2	Improving	5	4,39
3	Learning	4	3,63	3	School	4	3,51
4	Being twins with others	3	2,72	4	Innovation	4	3,51
5	Dream	3	2,72	5	Door	3	2,63
6	Magic box	3	2,72	6	Ocean	3	2,63
7	Sharing	3	2,72	7	Window	3	2,63
8	World road	3	2,72	8	The Universe	3	2,63
9	Container	2	1,82	9	Family environment	2	1,75
10	Creativity toolbox	2	1,82	10	Connector	2	1,75
11	Creativity	2	1,82	11	Friend maker	2	1,75
12	Friendship	2	1,82	12	The World	2	1,75
13	Great emotion	2	1,82	13	Web	2	1,75
14	Happiness	2	1,82	14	Different point of view	2	1,75
15	Melting pot	2	1,82	15	Collaboration	2	1,75
16	Motivating	2	1,82	16	Wing	2	1,75
17	Platform	2	1,82	17	Butterfly	2	1,75
18	Sea	2	1,82	18	Book	2	1,75
19	Tool	2	1,82	19	Teacher	2	1,75
20	Wing	2	1,82	20	Advertisement	2	1,75
21	Addiction	1	0,91	21	Love	2	1,75
22	Additional material	1	0,91	22	Horizon expander	2	1,75
23	Airplane	1	0,91	23	Showcase	2	1,75
24	Amazing	1	0,91	24	Race	2	1,75
25	Another world	1	0,91	25	3D glasses	1	0,88
26	Bands people together	1	0,91	26	Tree	1	0,88
27	Beautiful flower	1	0,91	27	Friendship	1	0,88
28	Birds	1	0,91	28	Not looking through the blinkers	1	0,88
29	Colorful hand-knotted carpet	1	0,91	29	Springtime	1	0,88
30	Colorful world	1	0,91	30	Balloon	1	0,88
31	Communication	1	0,91	31	Step	1	0,88
32	Dictionary (D.V.P.)	1	0,91	32	Uniter	1	0,88
33	Dictionary (E.)	1	0,91	33	Blank board	1	0,88
34	Discovering	1	0,91	34	Diversity	1	0,88
35	Encouragement	1	0,91	35	Mountain	1	0,88
36	Enjoyable	1	0,91	36	Binoculars	1	0,88
37	Free gateway	1	0,91	37	Education	1	0,88
38	Freedom	1	0,91	38	Child	1	0,88
39	Game	1	0,91	39	Sacrifice	1	0,88

40	Good information	1	0,91	40	Sapling	1	0,88
41	Good online portal	1	0,91	41	Planet	1	0,88
42	Good opportunity	1	0,91	42	Pigeon	1	0,88
43	Great family	1	0,91	43	Air	1	0,88
44	Heaven	1	0,91	44	Treasure chest	1	0,88
45	Innovation	1	0,91	45	Exciting	1	0,88
46	Inspiring	1	0,91	46	Light	1	0,88
47	İstanbul	1	0,91	47	Cooperation	1	0,88
48	Journey	1	0,91	48	Socializing	1	0,88
49	Key	1	0,91	49	Bridge	1	0,88
50	Large vessel	1	0,91	50	Respect for the king	1	0,88
51	Light	1	0,91	51	Cultural ambassador	1	0,88
52	Live	1	0,91	52	Globalization	1	0,88
53	Net	1	0,91	53	Lectern	1	0,88
54	New starting point	1	0,91	54	Laboratory	1	0,88
55	New strategy	1	0,91	55	Matryoshka doll	1	0,88
56	Obsession	1	0,91	56	Metropolis	1	0,88
57	Ocean	1	0,91	57	Source of motivation	1	0,88
58	Open door	1	0,91	58	Learning enriching	1	0,88
59	Party	1	0,91	59	Leader	1	0,88
60	Pear	1	0,91	60	Freedom	1	0,88
61	Poker game	1	0,91	61	Self-confidence builder	1	0,88
62	Power fuel	1	0,91	62	Puzzle	1	0,88
63	Powerful engine	1	0,91	63	Rocket	1	0,88
64	Progress	1	0,91	64	Dream	1	0,88
65	Sea of opportunities	1	0,91	65	Virtual glasses	1	0,88
66	Star	1	0,91	66	Art	1	0,88
67	Story of sharing	1	0,91	67	Unlimited	1	0,88
68	Teacher	1	0,91	68	Life style	1	0,88
69	Translator of differences	1	0,91	69	Rebirth	1	0,88
70	Treasure	1	0,91	70	Meal	1	0,88
71	Train	1	0,91	71	Brainteaser	1	0,88
72	Uplifting	1	0,91				
73	Way	1	0,91				
74	Web	1	0,91				
75	Yoghurt yeast	1	0,91				
	Total	**110**	**100**		**Total**	**114**	**100**

Considering the left column of Table 2, it is clear that 110 teachers working abroad produced 75 different metaphors. These are; "window" 7 times, "bridge" 5 times, "learning" 4 times, "being twins with others", "dream", "magic box", "sharing" and "world road" 3 times, "container", "creativity toolbox", "creativity", "friendship", "great emotion",

"happiness", "melting pot", "motivating", "platform", "sea", "tool" and the "wing" metaphors twice. The remaining 55 metaphors are repeated just once.

On the other hand, on the right column of Table 2, it is clear that 71 different metaphors for eTwinning have been produced by 114 teachers in Turkey. Teachers repeated the metaphors of "sharing" 10 times, "improving" 5 times, "school" 4 times, "innovation" 4 times, and metaphors of "door", "ocean", "window", and "the universe" 3 times, respectively. Moreover, they repeat the metaphors of "family environment, connector, friend maker, The World, web, different point of view, collaboration, wing, butterfly, book, teacher, advertisement, love, horizon expander, showcase and race" twice. The remaining 47 metaphors are repeated only once.

Considering the metaphors produced by teachers abroad and teachers in Turkey, it can be said that teachers abroad have produced more metaphors than teachers in Turkey. Below, Table 3 shows the categories, the numbers, frequencies and percentages of metaphors for eTwinning projects produced by teachers in Turkey and abroad.

Table 3

eTwinning Metaphors by Categories

Teachers Abroad			Categories	Teachers in Turkey		
%	-f-	Number of Metaphors		Number of Metaphors	-f-	%
11,81	13	11	Different View Point	17	24	21,05
25,45	28	16	Exploratory View	11	22	19,29
23,63	26	14	Cooperation	8	19	16,67
18,18	20	15	Education	10	18	15,79
2,72	3	2	Values	9	13	11,40
2,72	3	3	Analytical View	8	8	7,02
15,45	17	14	Emotionality	3	3	2,64
-	-	-	Negative View	5	7	6,14
100	**110**	**75**	**Total**	**71**	**114**	**100**

According to Table 3, it is clear that metaphors produced by teachers abroad can be grouped under 7 categories which are "Different View Point, Exploratory View, Cooperation, Education, Values, Analytical View, and Emotionality".

It is obvious that the metaphors produced most by the participants are in the category of "Exploratory View". 28 teachers have produced 16 metaphors in this category. In the "Education" category 20 teachers have produced 15 metaphors, and the teachers have produced the least number of metaphors in "Values and Analytical View" categories.

On the other hand, again, according to Table 3, it is clear that metaphors produced by teachers in Turkey can be grouped under 8 categories which are "Different View Point, Exploratory View, Cooperation, Education, Values, Analytical View, Emotionality, and Negative View".

It is clear from the table above that the metaphors produced most by the teachers in Turkey are in the category of "Different View Point". In the "Exploratory View" category, which is the second category with the most metaphors, 22 teachers have produced 11 metaphors. Teachers have produced the least number of metaphors, only 3, in the "Emotionality" category. Table 4, below, shows the metaphors that teachers have produced under the category of "Different View Point".

Table 4

Metaphors in Different View Point Category

Teachers Abroad			Teachers in Turkey		
Metaphors	**-f-**	**%**	**Metaphors**	**-f-**	**%**
Magic box	3	2,72	Ocean	3	2,63
Another world	1	0,91	The Universe	3	2,63
Beautiful flower	1	0,91	The world	2	1,75
Colorful hand-knotted carpet	1	0,91	Showcase	2	1,75
Colorful world	1	0,91	Butterfly	2	1,75
Dictionary	1	0,91	Springtime	1	0,88
Heaven	1	0,91	Diversity	1	0,88
Large vessel	1	0,91	Planet	1	0,88
Party	1	0,91	Treasure chest	1	0,88
Translator of differences	1	0,91	Not looking through the blinkers	1	0,88
Train	1	0,91	Lectern	1	0,88
			3D glasses	1	0,88
			Metropolis	1	0,88
			Meal	1	0,88
			Globalization	1	0,88
			Life style	1	0,88
			Matryoshka doll	1	0,88
Total	**13**	**11,82**	**Total**	**24**	**20,19**

Table 4 shows that, 13 teachers abroad have produced a total of 13 metaphors for eTwinning in the category of "Different View". Teachers have mostly produced the "magic box" metaphor, 3 times, in this category. Additionally, they have produced different metaphors like "another world, beautiful flower, colorful hand-knotted carpet, colorful World and dictionary". The results show that teachers have described eTwinning as a magic box open to surprises, a colorful world, and a hand-woven carpet with colorful patterns.

On the contrary, according to Table 4, 24 teachers in Turkey produced 17 different metaphors for eTwinning in the category of "Different View". Teachers have mostly

produced "ocean" and "the universe" metaphors in this category, 3 times. The metaphors of "the world, showcase and butterfly" have been produced by two teachers each. Teachers regard eTwinning as a tool, containing unlimited diversity such as an ocean, The World, the universe, a butterfly, and a showcase providing the visibility of products inside. Some examples of the metaphors in this category are given below.

"eTwinning is a magic box, because it's full of surprises." (T. A. 30)

"eTwinning is another world, because it can take me to different places." (T. A. 100)

"eTwinning is a beautiful flower, because it's a pleasure to see and to smell it." (T. A. 2)

"eTwinning is an ocean, because an ocean takes me to vast different interactions." (T.T.40)

"eTwinning is the World, because it is a wealth of different people, different ideas, and differences." (T.T. 96)

"eTwinning is a showcase, because it shows the most beautiful products." (T.T. 111)

Table 5

Metaphors in Exploratory View Category

Teachers Abroad			Teachers in Turkey		
Metaphors	**-f-**	**%**	**Metaphors**	**-f-**	**%**
Window	7	6,36	Innovation	4	3,51
Dream	3	2,72	Door	3	2,63
Container	2	1,81	Window	3	2,63
Creativity	2	1,81	Different point of view	2	1,75
Sea	2	1,81	Book	2	1,75
Wing	2	1,81	Wing	2	1,75
Airplane	1	0,91	Horizon expander	2	1,75
Birds	1	0,91	Pigeon	1	0,88
Discovering	1	0,91	Freedom	1	0,88
Freedom	1	0,91	Dream	1	0,88
Innovation	1	0,91	Rebirth	1	0,88
Inspiring	1	0,91			
Journey	1	0,91			
Key	1	0,91			
Light	1	0,91			
Pear	1	0,91			
Total	**28**	**25,45**	**Total**	**22**	**19,30**

Table 5 shows that 28 teachers abroad have produced 16 different metaphors in the "Exploratory View" category. They have mostly produced the "window" metaphor, 4 times, in this category. Then, they have produced "dream, container, creativity, sea and wing"

metaphors respectively. Teachers think of eTwinning as a window or a wing for new places, people and cultures, a dream to reach, a container or sea full of ideas enhancing creativity.

Moreover, according to Table 5, 22 teachers in Turkey have produced 11 different metaphors in this category. The most repeated, four times, metaphor in this category is "innovation". "Door and window" metaphors have been produced by three teachers each. "Different point of view, book, wings and emotionality" metaphors have been produced four times. Teachers perceive eTwinning as a book that offers a new perspective, opens up horizons and needs to be discovered. Furthermore, they perceive it as a wing, a door or a window that leads to differences and innovations. Some examples of the metaphors in this category are given below.

"eTwinning is a window, because it gives students different perspectives." (T. A. 9)

"eTwinning is a dream, because it shows me wonderful places and great ideas for working with children." (T. A. 49)

"eTwinning is a container, because ... it's full of ideas." (T. A. 29)

"eTwinning is an innovation, because in my 20th year in profession, I came across concepts and trainings that I did not know. I experienced new things. This allowed me to renew myself." (T.T. 15)

"eTwinning is a door, because it opens the door to the creation of many ideas and creative activities with cooperation." (T.T. 4)

"eTwinning is wings, because it adds differences and innovations to my work. New approaches offer environments for applying new methods and techniques; it offers the opportunity to develop a dialogue with friends with whom you do the same job, to introduce new products and to work together with our colleagues working in different environments." (T.T. 75)

Table 6

Metaphors in Cooperation Category

Teachers Abroad			Teachers in Turkey		
Metaphors	-f-	%	Metaphors	-f-	%
Bridge	5	4,54	Sharing	10	8,77
Being twins with others	3	2,72	Connector	2	1,75
Sharing	3	2,72	Collaboration	2	1,75
World road	3	2,72	Cultural Ambassador	1	0,88
Melting pot	2	1,81	Uniter	1	0,88
Platform	2	1,81	Cooperation	1	0,88
Bands people together	1	0,91	Bridge	1	0,88
Communication	1	0,91	Puzzle	1	0,88
Good opportunity	1	0,91			
Net	1	0,91			
Story of sharing	1	0,91			

Treasure	1	0,91			
Web	1	0,91			
Yoghurt yeast	1	0,91			
Total	**26**	**23,6**	**Total**	**19**	**16,67**

According to Table 6, 26 teachers abroad produced 13 different metaphors for eTwinning in the "Cooperation" category. In this category, they mostly associated "the bridge" metaphor for eTwinning. They have also produced "being twins with others, sharing, and world road" metaphors. Teachers have also produced the "melting pot" and "platform" metaphors for eTwinning. Teachers consider eTwinning as a bridge that allows sharing and collaboration with others in educational practices, a melting pot for the same goal or a path to be walked together.

What is more, Table 6 shows that teachers in Turkey produced 8 metaphors for eTwinning in the "Cooperation" category. They have mostly associated eTwinning with "sharing" metaphor in this category. They have preferred "connector" and "collaboration" metaphors twice for each. They perceive eTwinning as a tool for sharing knowledge and skills, collaborating on educational activities, supporting professional and personal development and presenting cultural values. Some examples of the metaphors in this category are given below.

"eTwinning is a bridge, because it links different cultures and unites people." (T.A. 23)

"eTwinning is being twins with others, because while working together we are at the same place, time and purpose." (T. A. 72)

"eTwinning is a world road, because it connects us to people." (T. A. 92)

"eTwinning is sharing, because good things multiply when shared." (T.T.1)

"eTwinning is a connector, because it connects us with different cultures. It allows us to be together even though there are distances between us." (T.T. 52)

"eTwinning is collaboration, because when you work in it, everyone helps each other, learns and supports each other." (T.T. 3)

Table 7
Metaphors in Education Category

Teachers Abroad			Teachers in Turkey		
Metaphors	**-f-**	**%**	**Metaphors**	**-f-**	**%**
Learning	4	3,63	Improving	5	4,39
Creativity toolbox	2	1,82	School	4	3,51
Tool	2	1,82	Teacher	2	1,75
Additional material	1	0,91	Art	1	0,88

Dictionary	1	0,91	Blank board	1	0,88
Good information	1	0,91	Brainteaser	1	0,88
Good online portal	1	0,91	Learning enriching	1	0,88
New starting point	1	0,91	Education	1	0,88
New strategy	1	0,91	Laboratory	1	0,88
Ocean	1	0,91	Sapling	1	0,88
Progress	1	0,91			
Sea of opportunities	1	0,91			
Star	1	0,91			
Teacher	1	0,91			
Way	1	0,91			
Total	**30**	**27,27**	**Total**	**18**	**15,79**

Table 7 shows that, 30 teachers abroad have produced 16 different metaphors for eTwinning in "Education" category. In this category "learning" is the most frequently produced metaphor, 4 times. In this category, "creativity toolbox and tool" have been produced by two teachers each. The participants regard eTwinning as a helpful element in developing effective learning and creativity.

According to Table 7, in the category of "Education", 10 different metaphors have been produced by a total of 18 teachers in Turkey, it is obvious that "improving" is the most frequently produced metaphor. In this category, 4 teachers associated eTwinning with "school" and 2 teachers with the metaphor of the "teacher." The participants consider eTwinning as a school, a tool that constantly develops themselves and their students personally and professionally, like a teacher. Some examples of the metaphors in this category are given below.

"eTwinning is learning, because it allows educational cooperation and knowledge from other countries' working ways." (T. A. 98)

"eTwinning is a creativity toolbox, because it also surprises me and my students raising our positive energy." (T.A. 7)

"eTwinning is a good online portal, because it gives the opportunity to collaborate with different people all around the world." (T. A. 19)

"eTwinning is improving, because it improves our teaching techniques with Web 2.0 tools and new generation technological tools." (T.T. 51)

"eTwinning is a school, because it develops people, encourages learning, research and cooperation." (T. T. 8)

"eTwinning is art, because it makes a masterpiece." (T. T. 44)

Table 8

Metaphors in Values Category

Teachers Abroad			Teachers in Turkey		
Metaphors	**-f-**	**%**	**Metaphors**	**-f-**	**%**
Friendship	2	1,82	Love	2	1,75
Great family	1	0,91	Web	2	1,75
			Family Environment	2	1,75
			Friend Maker	2	1,75
			Tree	1	0,88
			Friendship	1	0,88
			Socializing	1	0,88
			Child	1	0,88
			Sacrifice	1	0,88
Total	**3**	**2,72**	**Total**	**13**	**11,40**

Table 8 shows that, 2 different metaphors have been produced by 3 teachers abroad in "Values" category. In this category, teachers associated eTwinning with the metaphors of "friendship", twice, and "great family" once. Teachers think of eTwinning as a platform providing an environment for values such as friendship and family.

Furthermore, according to Table 8, a total of 9 metaphors have been produced by 13 teachers in Turkey in "Values" category. In this category, teachers associated eTwinning with the metaphors of "love, network, family environment, and friend-making" twice, and the metaphors of "tree, friend, socializing, child, and sacrifice" once. Teachers consider eTwinning as a tool that provides integration by creating a love of network that cares about values such as family and friendship. Some examples of the metaphors in this category are given below.

"eTwinning is friendship, because … gathering us together." (T. A. 42)

"eTwinning is a great family, because helps to enrich knowledge." (T. A. 86)

"eTwinning is love, because it multiplies when shared. Our bond with distant schools becomes stronger." (T.T. 13)

"eTwinning is a friend maker, because it is knowing partners. In this way, it is possible to meet new friends and unite on common points." (T.T. 44)

Table 9

Metaphors in Analytical View Category

Teachers Abroad			Teachers in Turkey		
Metaphors	**-f-**	**%**	**Metaphors**	**-f-**	**%**
Free gateway	1	0,91	Unlimited	1	0,88
Open door	1	0,91	Step	1	0,88
Poker game	1	0,91	Mountain	1	0,88
			Binoculars	1	0,88
			Lights	1	0,88
			Leader	1	0,88
			Rocket	1	0,88
			Virtual Glasses	1	0,88
Total	**3**	**2,72**	**Total**	**8**	**7,02**

Table 9 shows that, in the category of "Analytical View", 3 teachers abroad have produced 3 different metaphors for eTwinning, which are "free gateway, open door and poker game". Teachers regard eTwinning as an open door to development and change, a method to be followed freely, a game that requires strategy.

On the other hand, Table 9 shows that, 8 teachers in Turkey have produced 8 different metaphors for eTwinning in the "Analytical View" category, which are "unlimited, step, mountain, binoculars, light, leader, rocket, and virtual glasses".

According to teachers, eTwinning is a tool which is open to development, offers unlimited learning and teaching opportunities, and offers opportunities to recognize and solve problems. Some examples of the metaphors in this category are given below.

"eTwinning is a free gateway, because I enter in a world with kind people where cooperation, sharing and fun are everywhere." (T. A. 98)

"eTwinning is an open door, because it supports connections and relationships that overcome distances." (T. A. 36)

"eTwinning is a poker game, because eTwinning presents you with good and bad, risks and rewards, opportunities and setbacks. When making decisions (big or small) I've found things that work best if I keep my objectives and trust my own judgment." (T. A. 4)

"eTwinning is unlimited, because it travels to dreams and dreams have no end." (T.T. 4)

"eTwinning is a step, because you always go higher. The new Web 2.0 tools teach and give pleasure." (T.T. 19)

"eTwinning is a mountain, because you keep rising." (T.T. 33)

Table 10

Metaphors in Emotionality Category

Teachers Abroad			Teachers in Turkey		
Metaphors	**-f-**	**%**	**Metaphors**	**-f-**	**%**
Great emotion	2	1,82	Self-confidence builder	1	0,88
Happiness	2	1,82	Source of motivation	1	0,88
Motivating	2	1,82	Exciting	1	0,88
Addiction	1	0,91			
Amazing	1	0,91			
Encouragement	1	0,91			
Enjoyable	1	0,91			
Game	1	0,91			
İstanbul	1	0,91			
Live	1	0,91			
Obsession	1	0,91			
Power fuel	1	0,91			
Powerful engine	1	0,91			
Uplifting	1	0,91			
Total	**17**	**15,45**	**Total**	**3**	**2,64**

Table 10 shows that, 17 teachers abroad produced 14 different metaphors in the category of "Emotionality". In this category teachers have associated eTwinning with "great emotion, happiness and motivating" metaphors. Teachers think that, eTwinning projects have a motivating and happy environment that makes people feel good.

According to Table 10, 3 different metaphors have been produced by 3 teachers in Turkey in the "Emotionality" category. In this category, eTwinning is associated with "self-confidence builder, source of motivation and exciting" metaphors once. According to teachers, to achieve better educational practices, eTwinning has exciting and motivating qualities. Some examples of the metaphors in this category are given below.

"eTwinning is a great emotion, because it feels good." (T. A. 94)

"eTwinning is happiness, because it gives me power and moral." (T. A. 78)

"eTwinning is motivating, because it allows different possibilities." (T. A. 45)

"eTwinning is a self-confidence builder, because it made me feel more self-confident. I learned a lot." (T.T. 36)

"eTwinning is motivation, because my students are incredibly happy and enthusiastic in the lessons." (T.T. 34)

"eTwinning is exciting, because it always renews you." (T.T. 71)

Table 11

Metaphors in Negative View Category

Teachers in Turkey		
Metaphors	**-f-**	**%**
Advertisement	2	1,75
Race	2	1,75
Balloon	1	0,88
Air	1	0,88
Respect for the King	1	0,88
Total	**7**	**6,14**

Table 11 shows that, 5 different metaphors have been produced by 7 teachers in Turkey in the "Negative View" category. While 2 teachers associated eTwinning with "advertising and racing" metaphors each, one teacher associated it with "balloon, air and respect for the king" metaphors each. They think that, eTwinning is a race, an unnecessary effort, a show tool that has no depth which loses its feature in a short time; it has appearance but has no weight. Some examples of the metaphors in this category are given below.

"eTwinning is a race, because it's a useless hustle." (T.T. 81)

"eTwinning is an advertisement, because it is an advertisement that is forced on people. I don't believe it's really helpful and most of what appears to be done is fake, just photos videos." (T.T. 26)

"eTwinning is air, because its existence or non-existence is not certain." (T.T. 88)

CONCLUSION & DISCUSSION

In this research, 110 teachers abroad have produced 75 different metaphors and 114 teachers in Turkey have produced 71 different metaphors for eTwinning. It has been found that while teachers abroad produced metaphors that can be grouped in 7 categories teachers in Turkey produced metaphors that can be grouped in 8 categories. Depending on the results, it can be concluded that the variety of metaphors produced by teachers abroad is more than the ones produced by teachers in Turkey. This result may be due to the participation of teachers from different countries abroad.

eTwinning, with teachers from 36 European countries and 8 neighbouring countries, is a huge digital platform serving in 31 languages. It allows users to find partners from their own country or abroad, interact, collaborate on projects, participate in professional development activities organized nationally or across Europe (Gilleran, 2019, p. 6). Therefore, it helps teachers discover different languages, cultures, people, educational practices, places, history and so on.

Teachers abroad have emphasized the diversity and labour-intensive aspects of eTwinning in the "Different View" category, with metaphors such as the magic box full of surprises, another world, and a colorful hand-woven carpet. Teachers in Turkey, on the other hand, by comparing it to a showcase, have drawn attention to the aspect of eTwinning providing awareness of the works produced. As Başaran et al. (2020) stated, teachers become aware of cultural diversity, different teaching practices and develop different perspectives by observing and interacting with educational environments in different countries with their eTwinning projects.

While teachers abroad have produced 16 different metaphors in the category of "Exploratory View", teachers in Turkey have produced 11 different metaphors. In both teacher groups, the window metaphor has been produced in terms of innovation and reaching differences. According to Ülker (2018), a window makes the individual feel free in the space they are in and provides access to outside, just as a teacher abroad has stated "*eTwinning is a window that gives students different perspectives*" (T. A. 9). When the explanations of the metaphors used by both groups of teachers in the "Exploratory View" category are examined, it is clear that teachers have emphasized the fact that eTwinning offers a new perspective, opens the horizon, and gives an opportunity to discover differences and innovations. eTwinning allows teachers to work and communicate collaboratively with other teachers via the eTwinning platform or eTwinning Live, it also allows students to communicate and work collaboratively with other students through Web 2.0 tools, write stories or have the work of project partners evaluated by other peers (Galvin et al., 2006).

In "Cooperation" category, teachers abroad have produced 13 different metaphors and teachers in Turkey have produced 8 different metaphors for eTwinning. Teachers abroad have used the "bridge" metaphor for eTwinning's ability to bring together those with the same goal; teachers in Turkey, on the other hand, have frequently preferred "sharing" metaphor because it allowed them to share useful practices. Metaphors produced by both teacher groups in this category draws attention to the importance of cooperation such as supporting each other for personal and professional development, increasing the knowledge and skills of students, and working together towards the same goal to achieve better. The existence of an environment in the eTwinning portal where everyone supports each other, solutions to problems are developed, and good examples are praised (Akıncı, 2018), is due to the fact that it is planned as an educational social network that collaborates, using information Technologies, working on a common project remotely (Başaran et al., 2020). Similarly, Kearney and Gras-Velázquez (2015) found out in their studies that many teachers developed their collaborative skills with other teachers during eTwinning projects.

While teachers abroad have produced 16 different metaphors for eTwinning, teachers in Turkey have produced 10 different metaphors in the category of "Education". The metaphors produced in this category show that teachers abroad think of eTwinning as an online toolbox offering multiple opportunities for permanent, effective and collaborative

learning. Teachers in Turkey, with the metaphors they have produced, on the other hand, emphasized the developmental feature of eTwinning, which increases their personal and professional knowledge, skills and attitudes, which constantly encourages research. A teacher in Turkey (T.T. 8) said, "*eTwinning, like school, develops people, encourages learning, research and cooperation*". In the study done by Gençtürk Erdem et al. (2021) it has been found that eTwinning, offering important opportunities for the development of learning and innovation skills which are becoming increasingly important in the 21st century, teachers' digital literacy skills develop as the time they are engaged in eTwinning activities increases (Avcı, 2021).

Teachers in Turkey have produced more metaphors in the "Values" category than the teachers abroad. This is due to the fact that societies differ in their perceptions of values due to some reasons like religion, beliefs, social and political structure, culture and history. On the other hand, in the category of "Emotionality", for which teachers abroad have produced more metaphors than teachers in Turkey all participants of the research have described eTwinning with similar metaphors like a source of happiness, a great feeling that makes them feel good, motivating, excitement and self-confidence. In short, during eTwinning projects, teachers experience positive emotional processes and their motivation levels increase (Güzel et al., 2010).

It has been found that all of the metaphors in the "Negative View" category, for which teachers abroad have not produced any metaphors, have been produced by teachers in Turkey. This result may be due to the fact that teachers in Turkey think that some eTwinners use eTwinning to make themselves more visible, and that some school principals force teachers produce eTwinning projects. As a matter of fact, as some other researchers have stated, teacher thoughts like eTwinning does not directly provide any benefits, the projects are not original, and some oppressive approaches of school principals like making it compulsory to do projects can negatively affect the views of teachers (Timur & İmer Çetin, 2017).

RECOMMENDATIONS

It is thought that the results of this study may guide new studies to be done in terms of revealing the eTwinning perceptions in the minds of teachers in Turkey and abroad. It is recommended to increase the number of users and the effectiveness of the eTwinning portal, which provides opportunities for meeting, cooperation and professional and personal development for the increasing number of educators and students.

It is also recommended to investigate the causes of negative perceptions towards eTwinning and carry out studies to eliminate those negative perceptions. It is may be beneficial to implement encouraging regulations so that more teachers from different fields can take part in eTwinning activities.

In addition, the increase in comparative studies on different countries and societies will enable cross-cultural comparisons and benefit from different practices. In sum, increasing the number of eTwinning projects should be encouraged. In addition to information exchange in educational processes, it is thought that it may be beneficial for school principals to carry out eTwinning activities for the dissemination of positive practices in administrative processes.

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How Well Do First Grade Students, Learning to Read and Write by Distance Education During the Pandemic Period, Write? [1]

Nurhan AKTAŞ[2]   **Selva BAKKALOĞLU**[3]

Abstract:

The aim of this study was to examine the handwriting legibility and writing errors of first grade primary school students who were learning early literacy through distance education during the pandemic period, according to various variables. The research was designed according to the survey method, and the study group consisted of 211 students studying in the first grade of primary school. The "Multidimensional Legibility Scale", "Writing Errors Form", "Dictation Text" and "Copying Text" were used as data collection tools in the research. For the analysis of the research data, the legibility of the first grade primary school students' handwriting was analysed according to the "Multidimensional Legibility" scale. According to the results of the research, female students wrote more legibly than male students. Students made more writing errors in the dictation writing task than in the copying writing task. Students at state schools made more errors in their writing than students at private schools. Considering that the distance education process will also be a part of education life in later periods, research studies on the adequacy of the distance education process for fostering basic skills can be included in order to advance this process more beneficially, especially in primary school. The effect of distance education on handwriting legibility and writing errors at other grade levels can be investigated. Within the framework of the results obtained, different activities can be designed for writing skills in distance education.

Keywords: Handwriting Legibility, Writing Errors, Primary Education, Pandemic

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INTRODUCTION

Writing is a human need. As a matter of fact, the ability to write is used in accordance with certain rules in order to express one's beliefs, ideals, expectations, feelings and thoughts. There are many definitions in the literature about writing, which we use not only in the education process but in all areas of life.

Writing is the individual's explanation of his/her thoughts, imaginings and experiences through script (Göçer, 2018; Sever, 2004). Considering the definitions of writing (Göçer, 2018; Sever, 2004; Güneş, 2007; Barthes, 2007), it is seen that writing is a complex and multifaceted process between the reader and the writer. Therefore, writing skill is not an innate skill, but is a skill acquired through education (Duran & Akyol, 2010).

Writing, which is one of the basic skill areas in an individual's education life, is taught in the first grade of primary school together with the reading skill. In the teaching of writing, which is carried out in parallel with reading, the spelling of the sounds is taught simultaneously with their pronunciation (Arslan, 2012). In this sense, the purpose of early literacy teaching is to foster appropriate reading and writing skills based on skills such as speaking and listening that students have acquired in their out-of-school lives (Yılar, 2015). Writing skill is not random, and it is carried out in accordance with the language rules within a certain time schedule (Duran & Akyol, 2010).

In writing, both the quality of the text content and the grammar, visuality and spelling rules are of great importance. The last step in a text whose content has been planned properly is the legibility of that text. If a piece of writing is not legible, its content cannot be related in the desired way, nor can it be understood by the reader (Akyol, 2010). Legibility demonstrates the adequacy of the letters in the handwriting presented to the reader and constitutes an important dimension of handwriting assessments (Ediger, 2001). In assessments of legibility, the focus is on formal characteristics rather than features like spelling, word use, and grammar (Graham, Berninger & Weinraub, 1998). The form of the letters, the spacing between the letters, the slope of the letters, and writing by staying on the line are elements related to the formal features of letters, in other words, to legibility (Tok & Erdoğan, 2017). In fact, Tompkins (2005) explained legibility in six dimensions: the shape of the letters, the size of the letters and the ratio of upper- and lower-case letters, the spacing between letters and words, the slope, staying on the line, and the quality of the lines forming the letters.

According to Akyol (2006), a student who acquires the ability to write legibly should be able to write the letters correctly, make the extensions of the letters appropriately, place the hand and arm on the desk correctly during writing, hold the pencil correctly, write at an appropriate speed, keep the paper on which he/she writes clean and tidy, and keep to the lines correctly. For students to be able to learn all these writing rules, dictation and copying exercises should be frequently included in writing teaching (Akyol, 2006). By definition, dictation is the shaping of the sounds heard through speech and converting them into

concrete form through writing (Hengirmen, 1990). Dictation, which includes some sub-skills such as observing the spelling rules and punctuation marks, as well as developing listening skills such as listening carefully and listening without missing the main idea (Taşkaya, 2019), is of great importance not only in terms of the acquisition of writing skills, but also with regard to taking notes in all areas of life in the long term (Zhytska, 2013). In the dictation technique, the teacher asks the student to write a text appropriate for his/her grade level by reading it out in a way and at a speed that the student can understand. During the process or at the end of the process, the teacher contributes to the development of the student's writing skills by providing feedback by checking writing, spelling and punctuation errors (Yurdakul & Susar, 2020). Copying, on the other hand, means that the student looks at a text given to him/her and writes the text again.

Especially in the first grades, it is important in both educational and social terms for children to acquire the ability to write at an appropriate pace, in an orderly way, and legibly (Yıldız & Ateş, 2010; Ziviani & Watson-Will, 1998). For this reason, legibility is seen as an important criterion in the development of handwriting (Akyol, 2008; Galanis, 2008), and it is a subject that should be emphasised at every grade level. In fact, when the studies on legibility are examined, it is seen that besides studies conducted in the first grade, when the literacy process begins to be fostered (Graham, Weintraub & Berninger, 2001; Vlachos & Bonoti, 2006; Öğüt, 2018; Ulu, 2019; Gök & Baş, 2020; Okatan & Özer, 2020), the legibility of students' writing is also examined at other grade levels (Yıldız & Ateş, 2010; Schwellnus, Carnahan, Kushki, Polatajko, Missiuna & Chau, 2012; Ghorbani, Yadolahzadeh, Shakki & Noohpiseh, 2020).

In addition to being a factor that affects the writing skill, legibility is also affected by many factors. Elements such as the student's sitting position, muscle development, writing direction, hand preference and pencil grip, the position of the paper, the letters, writing speed, and staying on the line all affect the writing and the elegance and legibility of the writing. If these elements are not taken into consideration, the desired legibility cannot be achieved and writing errors occur. Indeed, in her study in which she examined the handwriting legibility of first grade primary school students, Ulu (2019) concluded that as the students' legibility increased, their writing errors decreased. It is possible to classify writing errors as omitting letters, omitting syllables, omitting words, misplaced writing, confusing letters, compound writing, separating syllables, adding words, writing words incorrectly, spelling mistakes, writing slowly, and inability to write (Erden, Kurdoğlu & Uslu, 2002). In order to prevent the aforementioned writing errors, guiding the student correctly, especially during the writing education given in the first grade of primary school, is an important process in reducing writing errors and ensuring that the student writes correctly. Studies (Ulu, 2019; Babayiğit, 2019; Balkan, 2015; Memiş & Harmankaya, 2012; Akyıldız, 2011) have shown that the types of mistakes made by first grade primary school students are similar, and that similar errors also appear to be encountered at other grade

levels (Koçak Demir, 2003; Yıldız & Ateş, 2010). Therefore, the importance of writing education given in the first grade of primary school comes to the fore.

The student who is to acquire the writing skill, the teacher who is to guide this process, and the programme that structures the framework and content of the process are the general elements that directly affect the writing process. In addition to this, it is possible to discuss certain variables that indirectly affect writing education. It can be said that in recent times, one of the variables affecting writing education, as in other learning domains, is the distance education process.

Due to the COVID-19 pandemic process, which began to be experienced in our country in March 2020, certain changes had to be made in education, and students interrupted their face-to-face education and began the distance education process. Distance education activities, which are preferred due to Covid-19, have been carried out through various digital platforms (EBA, Zoom, Skype, etc.). The content prepared for each of the speaking, listening, reading, writing and grammar learning areas in the EBA education programme, which is the most widely used in the distance education process at the primary education level, is insufficient especially in the areas of listening and writing (Tanrıkulu, 2017). Studies show that these contents do not comply with the Turkish course curriculum (İskender, 2016). In addition, situations such as lack of technological equipment, weak internet connections and lack of interaction in teaching materials affect the distance education process negatively (Kesik & Baş, 2021).

One of the situations that negatively affect the distance education process is the differences in the socioeconomic level of families. One of the most reliable ways of examining students' access to the distance education process and its reflections on education in terms of socioeconomic level is to compare state school and private school students. Private schools are educational institutions that are preferred by parents with high socioeconomic status for their children, and where education and training services are offered with a paid and more intensive programme. It is seen that the education given in public schools and private schools, especially during the pandemic process, causes differences in terms of student success. As a matter of fact, in the study conducted by Yıldız, Aksoy, Eryılmaz, and Korkmaz (2021), students' learning losses during the epidemic were examined in terms of reading skills. As a result of the research, it was seen that socioeconomic level was effective in the development of reading skills and learning losses in the Covid-19 period. In a similar study, Vural (2007) stated that the socioeconomic level of the family affects the literacy performance of the student; he stated that while students with a high socioeconomic level and studying in private schools did not have reading problems, students at middle and lower socioeconomic levels had reading problems.

Purpose of the research

It can be said that it would be beneficial to examine the early literacy teaching process in distance education, and to revise it by investigating its deficiencies. It is seen that most of the studies in the field of education during the COVID-19 pandemic process have been aimed at examining the views of teachers and students (Bakioğlu & Çevik, 2020; Bayburtlu, 2020; Bozkurt, 2020; Demir & Özdaş, 2020; Özdoğan & Berkant, 2020). On the other hand, it can be said that the studies (Erkoca, 2021; Solak, Ütebay & Yalçın, 2020) conducted to

measure the proficiency of students in this process are limited. Especially in the literature, studies on teacher views on teaching literacy during the pandemic process (Erbaş, 2021; Gürbüz & Yılmaz, 2021; Kargın & Karataş, 2021; Sağırlı, 2021) have intensified. While computer-assisted primary literacy teaching positively affects the development of children's reading skills and reading speed, it does not have the same effect in terms of the development of dictation skills (Gürol & Yıldız; 2015). From this point of view, it is important to examine the effect of distance education on students' reading and writing skills, because writing skill is the last link in the chain of basic language skills (Demirel & Şahinel, 2006; Ünalan, 2006) and is an analytical skill that includes evaluation and problem-solving processes (Sharples, 1999). For this reason, writing is generally perceived as a skill that students shy away from and are unsuccessful in (Aydın, 2017; Özbay and Barutçu, 2013; Yalçın, 2002). Evaluation of the situation of writing skill, which has such difficulties even in face-to-face education, in the distance education process is worth researching in terms of its potential to obtain different results. From this point of view, the research shows how well first-year students who learned to read and write with distance education during the pandemic period wrote; it was designed to examine writing legibility and writing errors according to various variables. For this purpose, answers to the following questions were sought:

Sub-problems

1. Do the writing skills of first grade primary school students who learn to read and write through distance education differ significantly according to their copying and dictation studies?
2. Does the handwriting legibility of first grade primary school students differ significantly according to gender?
3. Does the handwriting legibility of first grade primary school students differ significantly according to school type?
4. Do the writing errors of first grade primary school students who learn to read and write through distance education differ significantly according to their copying and dictation studies?
5. Do first grade primary school students' writing errors differ significantly according to gender?
6. Do first grade primary school students' writing errors differ significantly according to school type?

METHOD

Research Model

This research, which aims to examine the written texts of first grade primary school students in terms of legibility, was designed with the survey model, which is one of the quantitative research methods. Survey studies are studies in which participants' views, or characteristics such as their interests, skills, abilities or attitudes related to a subject or event are determined, and are studies generally conducted on relatively larger samples compared to other studies. The main purpose of these studies is to define the characteristics of a group and to reveal how these characteristics are distributed within the group (Frankel, Wallen &

Hyun, 2012). In this research, the survey model was used because the aim was to examine the writing of first grade primary school students in terms of legibility and writing errors.

Participants

The study group of the research consists of a total of 211 students who continued their education in four primary schools (two state and two private) located in the city centre of Konya in the 2020-2021 academic year. The convenience sampling method was utilised to determine the study group. In convenience sampling, the researcher chooses a case that is close at hand and easy to access, thus gaining speed and practicality for the research (Yıldırım & Şimşek, 2013). Epidemic measures were taken into account in the selection of the sampling method. With this method, data were collected with the least mobility. The descriptive data of the study group are included in Table 1.

Table 1

Descriptive Statistics of Study Group

Gender / School Type	State		Private		Total	
	F	%	f	%	f	%
Female	72	56.25	38	45.7	110	52.13
Male	56	43.75	45	54.2	101	47.86
Total	128	60.66	83	39.33	211	100

According to Table 1, the study group of the research consists of 211 first grade primary school students, 128 from state schools and 83 from private schools. It is seen that approximately 52% of these students are girls and 48% are boys.

Data Collection Tools

In the research, the "Multidimensional Legibility Scale", "Writing Errors Form", "Dictation Text" and "Copying Text" were used as data collection tools in order to examine the handwriting legibility and writing errors of the first grade primary school students.

Multidimensional Legibility Scale: In the study, the "Multidimensional Legibility Scale" developed by Yıldız and Ateş (2010) was used to examine the written texts of the first grade primary school students in terms of legibility. The scale was developed in the years when cursive handwriting was taught as the compulsory and only style. The researchers who developed the scale made arrangements in some dimensions of the scale according to manuscript letters. The prepared scale form was requested from the researchers via e-mail.

The "Multidimensional Legibility Scale" consists of three categories: "completely competent" (3), "moderately competent" (2) and "not at all competent" (1). The legibility criteria in the rubric prepared according to the analytical evaluation approach are slope, spacing, size, shape and staying on the line. In this direction, students' manuscript writing

was handled separately for each sub-dimension in the research. Considering that the lowest score that can be obtained from this scale is 5 and the highest score is 15, students' written texts with a total score of 5 - 8.3 were assessed as illegible, students' written texts with a total score of 8.4 - 11.7 were evaluated as moderately legible, and students' written texts with a total score of 11.8 - 15 were assessed as legible. Examples of scoring of students' written texts according to the multidimensional legibility scale are given in Figure 1 and Figure 2.

Figure 1

Example of a legible piece of writing (State school, female student)
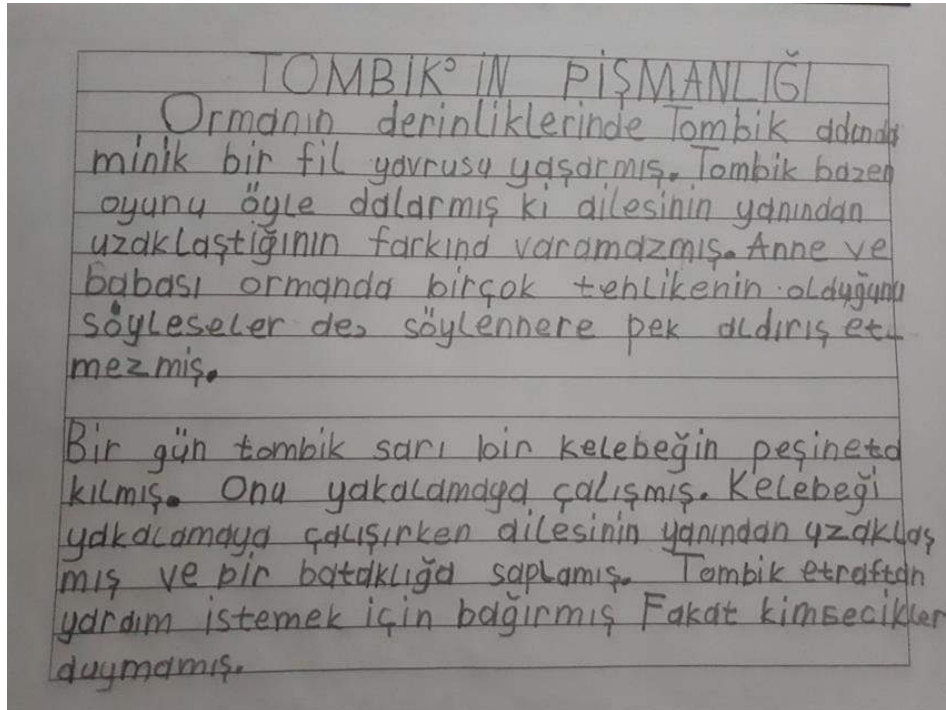
When the sample of writing shown in Figure 1 is analysed in terms of legibility, the total of 14 points obtained in terms of slope (2 points), spacing (3 points), size (3 points), shape (3 points) and staying on the line (3 points) indicates a competent level of legibility.

Figure 2

Example of an illegible piece of writing (Private school, male student)
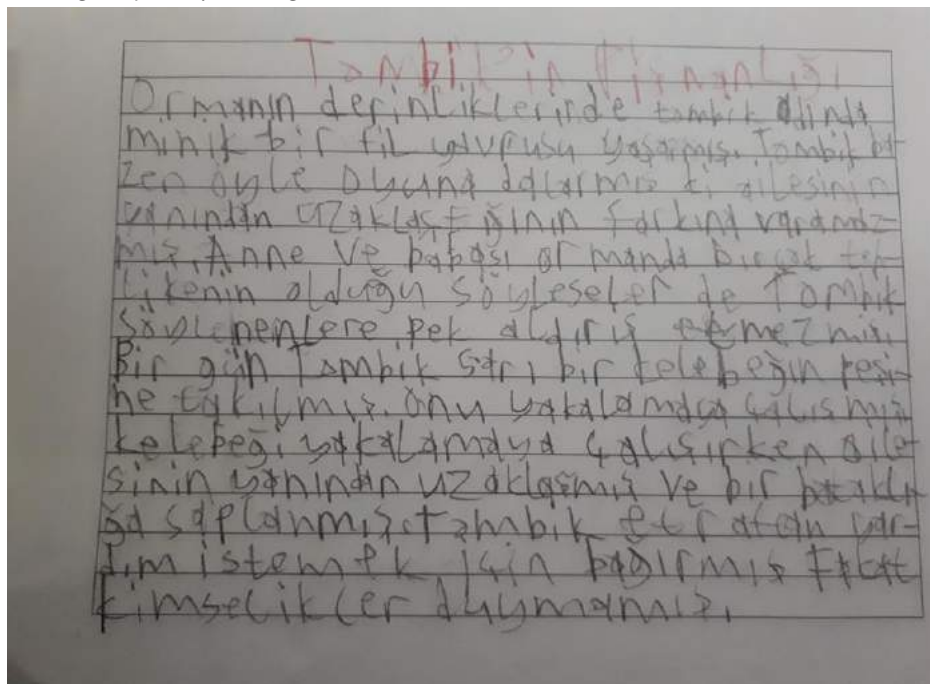
When the sample of writing shown in Figure 2 is analysed in terms of legibility, the total of 7 points obtained in terms of slope (2 points), spacing (1 point), size (1 point), shape (1 point) and staying on the line (2 points) indicates an inadequate level of legibility.

Writing Errors Form: The types of errors used in the research conducted by Erden, Kurdoğlu and Uslu (2002) were taken into account.

1. Letter Omission/Insertion: This is related to not writing letters that appear in the word or writing letters that do not appear in the word.

2. Syllable Omission/Insertion: This is related to not writing syllables that appear in the word or writing syllables that do not appear in the word.

3. Misplaced Writing: This concerns changing the places of some letters or syllables in words.

4. Letter Confusion: This is concerned with writing a letter that has a similar sound or shape to the correct one in words. The f-v, m-n, b-p, b-d, d-t, c-ç, t-k pairs of letters can be given as examples.

5. Writing Words Adjacently/Separately: This is related to not leaving the necessary spaces or writing words separately.

6. Syllable Separation at the End of the Line: This is the splitting of words in the wrong place at the end of a line.

7. Word Omission/Insertion: This is related to not writing words that appear in the text or writing words that do not appear in the text.

8. Writing the Word Incorrectly: This is the incorrect transcription of the word.

9. Spelling Mistakes: These are errors made in the use of punctuation marks.

Examples of scoring of students' written texts in terms of writing errors according to the writing errors form are given in Figure 3 and Figure 4.

Figure 3

Example showing letter omission/insertion, the most common type of error (State school, male student)

When the writing sample seen in Figure 3 is analysed in terms of writing errors, it has a total of 27 error points in terms of letter omission/insertion (11 times), syllable omission/insertion (2 times), misplaced writing (none), letter confusion (2 times), writing words adjacently/separately (none), syllable separation at the end of the line (2 times), word omission/insertion (9 times), writing the word incorrectly (1 time), and spelling mistakes (none). The most common type of error seen is letter omission/insertion.

Figure 4

Error-free example (Private school, female student)

When the writing sample seen in Figure 4 is examined in terms of writing errors, no writing errors can be seen. It has 0 error points in terms of writing errors.

Dictation and Copying Texts: In order to determine the writing skill levels of the students, four different text samples were determined by considering the subject content, length of text and number of words appropriate for the grade level. While deciding on the most appropriate text, opinions were obtained from eight first grade teachers. Six of the teachers decided on the texts named "A Feast Day with My Grandfather" and "Tombik's Regret". In line with the opinions received from the teachers and by also seeking the views of three academicians who are experts in the field of classroom education, the texts named "A Feast Day with My Grandfather" and "Tombik's Regret" were selected as dictation and copying texts, respectively (Appendix 1).

The text named "Tombik's Regret" was taken from the story book called "I Understand What I Read with Tales and Stories" (Bolat, Cebeci & İşbakan, 2018). The text named "A Feast Day with My Grandfather" was taken from the coursebook of Cem Publications, which was deemed appropriate to be used as a first grade primary school Turkish coursebook by the Ministry of National Education (Aksoy, Hamurcu, Akkuş & Ziya, 2019).

The research data were collected in the second semester of the 2020-2021 academic year, at the end of the second semester after the first grade students had completed their first literacy education. A total of 211 first grade primary school students participated in the research. The writing form was handed out to the students, and they were asked to write the text named "Tombik's Regret" on the upper part of the form within 1 lesson period. Following the copying task, they were asked to dictate the text named "A Feast Day with My Grandfather" under the guidance of their classroom teachers at a different lesson time. Prior to the data collection process, the classroom teachers were interviewed, and it was explained that they were not to intervene in the students' writing process. The researchers accompanied the classroom teachers during the data collection process. The two texts, namely dictation and copying, were used for all students.

Data Analysis

For the analysis of the research data, the legibility of the first grade primary school students' handwriting was analysed according to the "Multidimensional Legibility" scale. It was tested whether the data obtained from the sub-dimensions of the scale met the parametric test assumptions. The conformity of the data to normal distribution (the kurtosis and skewness values should be between -1 and +1) was examined using descriptive statistics and parametric test assumptions. Kurtosis and skewness coefficients that are in the range of -1 and +1, and an arithmetic mean, mode and median that are coincident (equal or close) are the most important indicators of normal distribution (Can, 2013, p.82-89). Accordingly, the arithmetic means and standard deviation values of the data were checked and the skewness

and kurtosis coefficients were taken into account. The central tendency measures and normality values of the data are shared in Table 2.

Table 2

Central Tendency Measures and Normality Values of Data

Variables	n	Lowest	Highest	(X)	(SD)	Skewness	Kurtosis
Legibility	211	10	30	18.72	5.19	.361	-.434
Writing Errors	211	0	98	13.71	12.6	2.30	9.56

When Table 2 is examined, it is seen that the data are normally distributed in the legibility dimension, but that the skewness-kurtosis coefficients and indices in the writing errors dimension are not within the desired range, and the graphics do not show a distribution related to normality, so the distribution of the data is not normal. Accordingly, the parametric "t-test for independent samples" was used for legibility, while the "Mann-Whitney U test" for non-parametric statistics was used to analyse writing errors.

Validity and Reliability

For the reliability of the research, the writings of the students were evaluated independently by two different researchers using the multidimensional legibility scale and writing errors forms. Then, the scores given by both researchers were compared. In cases where the researchers disagreed, the writing samples were evaluated together and the final decision on the scoring was made. The reliability of the study was calculated using the Reliability = Consensus / (Agreement + Disagreement) formula and it was seen that reliability was achieved with 90% agreement. According to this formula, values of 70% and above are considered sufficient (Miles & Huberman, 1994).

Ethical considerations

During the research process, first of all, necessary permissions were obtained from the ethics committee of Selcuk University Education Faculty and Konya Provincial Directorate of National Education.In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics", which is the second part of the directive, were not taken.

Ethical review board name: Selcuk University Faculty of Education Scientific Ethics Evaluation Board

Date of ethics review decision: 22/02/2021

Ethics assessment document issue number: E-16343714-605.02-31355

In addition, the students were informed that participation in the research was on a voluntary basis and that the data obtained would not be shared with third parties.

FINDINGS

In this part of the research, the handwriting legibility and writing errors of the first grade primary school students are examined according to the independent variables of copying and dictation tasks, gender, and school type, and an attempt is made to present them in the form of tables. Table 3 shows the t-test results for the copying and dictation variables of students' legible writing skills.

Table 3

T-test Results of Students' Scores for Sub-Dimensions of Legibility According to Writing Task

Sub-Dimensions of Legibility	Copying		Dictation			
	X̄	S	X̄	S	t	P
Slope	2.05	.58	2.03	.55	.255	.79
Spacing	1.66	.65	1.59	.63	1.13	.25
Size	1.82	.65	1.84	.68	-.36	.71
Shape	1.79	.74	1.73	.73	.72	.47
Staying on the Line	2.16	.67	2.01	.68	2.13	.03*
Total	9.49	2.67	9.23	2.71	.97	.32

*p<0.05

When Table 3 is examined, it is seen that the students' scores for the sub-dimensions of legibility of the copying task are slightly higher than those of the dictation task in all dimensions except size, but that the difference between them in total is not statistically significant (for slope (t(211)= .255; p>.05), for spacing (t(211)= 1.13; p>.05), for size (t(211)= -.36; p>.05), for shape (t(211)= .72; p>.05), and for staying on the line (t(211)= 2.13; p<.05). Only in the staying on the line sub-dimension of legibility was a significant difference found between the copying and dictation exercises. The t-test results for the gender variable of the students' legible writing skills are given in Table 4.

Table 4

T-test Results of Students' Scores for Sub-Dimensions of Legibility According to Gender

Sub-Dimensions of Legibility	Female		Male			
	X̄	S	X̄	S	t	P
Slope	4.21	1.08	3.95	1.02	1.83	.06
Spacing	3.46	1.17	3.02	1.14	2.71	.00*
Size	3.78	1.23	3.55	1.26	1.31	.18
Shape	3.70	1.39	3.34	1.39	1.83	.06
Staying on the Line	4.36	1.27	3.98	1.26	2.19	.03*
Total	19.52	5.03	17.86	5.24	2.35	.02*

*p<0.05

Looking at Table 4, it is seen that there is a statistically significant difference between the handwriting legibility scores of female students and the handwriting legibility scores of male students, except for the slope, size and shape dimensions (for slope (t(211)= 1.83; p>

0.05), for spacing (t(211)= 2.71; p < 0.05), for size (t(211)= 1.31; p> 0.05), for shape (t(211)= 1.83; p> 0.05), and for staying on the line (t(211) = 2.19; p< 0.05). It is seen that the scores of female students are higher than the scores of male students in all sub-dimensions of legibility. The t-test results for the school type variable of the students' legible writing skills are given in Table 5.

Table 5

T-test Results of Students' Scores for Sub-Dimensions of Legibility According to School Type

Sub-Dimensions of Legibility	State		Private		t	P
	$\bar{X}$	S	$\bar{X}$	S		
Slope	4.04	1.14	4.15	.91	-.73	.46
Spacing	3.16	1.21	3.39	1.10	-1.41	.15
Size	3.71	1.25	3.60	1.25	.65	.51
Shape	3.47	1.40	3.61	1.40	-.09	.48
Staying on the Line	4.10	1.39	4.30	1.07	-1.10	.27
Total	18.50	5.48	19.07	4.70	-.77	.44

*p<0.05

When Table 5 is examined, although the mean scores of the students studying in private schools are higher than those of the students studying in state schools in all sub-dimensions of legibility (except size), there is no statistically significant difference between them (p> 0.05).

In the study, the "Mann-Whitney U" test was used to analyse whether the data obtained from the writing errors of first grade primary school students learning to read and write through distance education showed a significant difference according to the copying and dictation exercises. The evaluation results of the students' writing errors are given in Table 6.

Table 6

Mann-Whitney U Test Results of Students' Writing Error Scores According to Writing Task

Error Type	Writing Task	n	Mean Rank	Rank Sum	U	P
Letter omission/insertion	Copying	211	217.5	45906.5		
	Dictation	211	205.4	43346.5	20980.5	.287
Syllable omission/insertion	Copying	211	220.1	46456.5		
	Dictation	211	202.8	42796.5	20430.5	.066
Misplaced writing	Copying	211	209	44099.0		
	Dictation	211	214	45154.0	21733	.092
Letter confusion	Copying	211	201.7	42568.5		.057
	Dictation	211	221.2	46684.5	20202.5	
Writing adjacently/separately	Copying	211	209.4	44202.5		
	Dictation	211	213.5	45050.5	21836.5	.240
	Copying	211	207.5	43782.0		

Syllable separation at the end of the line	Dictation	211	215.5	45471.0	21416	.352
Word omission/insertion	Copying	211	185.1	39076.0	16710	.000*
	Dictation	211	237.8	50177.0		
Writing the word incorrectly	Copying	211	207	43682.5	21316.5	.276
	Dictation	211	215.9	45570.5		
Spelling mistakes	Copying	211	189.4	39971.5	17605.5	.000*
	Dictation	211	233.5	49281.5		
Total	Copying	211	194	40934.0	18568	.003*
	Dictation	211	229	48319.0		

*p<0.05

When Table 6 is examined, there are significant differences for word omission/insertion (U=16710; p<0.05) and spelling mistakes (U=17605.5; p<0.05) according to the students' writing tasks. When the mean ranks are examined, it is seen that letter omission/insertion and syllable omission/insertion types of errors are more common in the copying task, while in the dictation task, misplaced writing, letter confusion, writing adjacently/separately, syllable separation at the end of the line, word omission/insertion, writing the word incorrectly, and spelling mistakes are the types of errors that were made more frequently. There is also a significant difference between writing tasks in terms of total error scores (U=18568; p<0.05). The evaluation results for the gender variable of the writing errors of the students are given in Table 7.

Table 7

Mann-Whitney U Test Results of Students' Writing Error Scores According to Gender

Error Type	Gender	n	Mean Rank	Rank Sum	U	P
Letter omission/insertion	Female	110	104.57	11502.5	5397.5	.719
	Male	101	107.56	10863.5		
Syllable omission/insertion	Female	110	104.96	11545.5	5440.5	.778
	Male	101	107.13	10820.5		
Misplaced writing	Female	110	104.38	11481.5	5376.5	.250
	Male	101	107.77	10884.5		
Letter confusion	Female	110	103.12	11343.0	5238.0	.452
	Male	101	109.14	11023.0		
Writing adjacently/separately	Female	110	103.93	11432.0	5327.0	.162
	Male	101	108.26	10934.0		
Syllable separation at the end of the line	Female	110	104.35	11478.5	5373.5	.628
	Male	101	107.80	10887.5		
Word omission/insertion	Female	110	98.30	10812.5	4707.5	.053
	Male	101	114.39	11553.5		
Writing the word incorrectly	Female	110	102.43	11267.5	5162.5	.288
	Male	101	109.89	11098.5		

Spelling mistakes	Female	110	102.40	11264.5		
	Male	101	109.92	11101.5	5159.5	.357
Total	Female	110	100.73	11080.0		
	Male	101	111.74	11286.0	4975.0	.190

*p<0.05

Looking at Table 7, there is no significant difference between male and female students in all error types (p > 0.05). When the mean rank is examined, it is seen that male students made more writing errors than female students in all error types, and the writing errors of the students do not show a significant difference according to gender (U=4975.0; p > 0.05). The evaluation results for the school type variable of students' writing errors are given in Table 8.

Table 8

Mann-Whitney U Test Results of Students' Writing Error Scores According to School Type

Error Type	School Type	n	Mean Rank	Rank Sum	U	P
Letter omission/insertion	State	128	123.06	15752.0		
	Private	83	79.69	6614.0	3128.0	.000*
Syllable omission/insertion	State	128	106.92	13686.0		
	Private	83	104.58	8680.0	5194.0	.766
Misplaced writing	State	128	107.27	13730.5		
	Private	83	104.04	8635.5	5149.5	.284
Letter confusion	State	128	126.16	16149.0		.000*
	Private	83	74.90	6217.0	2731.0	
Writing adjacently/separately	State	128	103.55	13255.0		
	Private	83	109.77	9111.0	4999.0	.050
Syllable separation at the end of the line	State	128	113.16	14484.0		
	Private	83	94.96	7882.0	4396.0	.012*
Word omission/insertion	State	128	109.91	14069.0		
	Private	83	99.96	8297.0	4811.0	.241
Writing the word incorrectly	State	128	110.68	14167.5		
	Private	83	98.78	8198.5	4712.5	.097
Spelling mistakes	State	128	112.11	14349.5		
	Private	83	96.58	8016.5	4530.5	.063
Total	State	128	122.18	15638.5	3241.5	
	Private	83	81.05	6727.5		.000*

*p<0.05

When Table 8 is examined, it is seen that among the writing errors according to the type of school attended by the students, letter omission/insertion (U=3128.0; p< 0.05), letter confusion (U=2731.0; p< 0.05) and syllable separation at the end of the line (U=4396.0; p< 0.05) error types differ significantly. When the mean ranks are examined, it is seen that the writing adjacently/separately error type was made more frequently by students studying in private schools, while the other types of errors were made more frequently by students

studying in state schools. In terms of total error scores, there is also a statistically significant difference according to school type (U=3241.5; p<.05).

DISCUSSION AND CONCLUSİON

The general purpose of primary literacy teaching is to enable students to acquire qualified literacy knowledge and skills that they will use throughout their lives. In addition to the factors that directly affect the writing process, there are some variables that indirectly affect the writing education. It can be said that one of the variables affecting writing education recently, as in other learning areas, is the distance education process. In this study, it was aimed to examine the writing legibility and writing errors of first-year students who learned to read and write with distance education during the pandemic period, according to various variables. this research; It was designed with a survey model, one of the quantitative research methods. In the analysis of the research data, the "Multidimensional Legibility" scale was used.

As a result of this study, which examined the handwriting legibility and writing errors of first grade primary school students who were learning to read and write through distance education during the pandemic period, it was concluded that the students' handwriting legibility differed significantly according to gender, but that there was no significant difference according to the writing task (copying-dictation) or school type (state-private). It is also seen that students' writing errors differed significantly according to writing task (copying-dictation) and school type (state-private), but that they did not differ significantly according to gender. While the significant differences seen in students' handwriting legibility by gender are similar to those found in some previous studies (e.g., Graham & Weintraub, 1996; Ziviani & Watson-Will, 1998; Graham, Weintraub & Berninger, 2001; Vlachos & Bonoti, 2006; Cordeiro, Castro & Limpo, 2018; Arslan Özer & Bağcı, 2018; Demiroğlu Memiş, 2018; Gök & Baş, 2020), they also differ from the results of other studies (e.g., Schwellnus, Carnahan, Kushki, Polatajko, Missiuna & Chau, 2012; Ghorbani, Yadolahzadeh, Shakki & Noohphiseh, 2020). As a result of their research in which they examined the legibility and writing speed of 372 students between the ages of 7-14, Ziviani and Watson-Will (1998) stated that girls were better than boys in terms of legibility and that the legibility of their texts differed significantly according to their gender, while they also found a low correlation between speed and legibility. In the study by Graham et al. (2001), in which they examined the letter legibility of 300 students from the first to the third grade, it was concluded that the gender factor affected the legibility of the students' writing. Vlachos and Bonoti (2006), on the other hand, examined the effect of age and gender on writing performance in children aged 7-12, and stated that age had a significant effect on writing performance, that girls wrote better and more legibly than boys, and that gender was important in the trend towards writing proficiency. Similarly, in her study, Demiroğlu Memiş (2018) stated that as the writing disposition increased, legibility increased and that female students wrote more legibly in relation to their writing disposition. In their study

examining the handwriting legibility of primary school students according to various variables, Gök and Baş (2020) worked with 136 first-year students, and as a result of the research, they concluded that female students scored higher in several dimensions of legibility (size, spacing, and shape) and overall, while socioeconomic level and the type of notebook used did not have an effect on the legibility of handwriting. Contrary to this, Schwellnus et al. (2012), in their study conducted with 120 fourth grade students, examined the effect of students' pencil grip position on writing speed and legibility, and as a result of the study, it was stated that the students' ways of holding the pencil did not have an effect on their legibility and writing speed, and that the female students wrote faster than the male students, but that the girls and boys had similar scores for legibility and no significant difference emerged. Again, as a result of the research conducted by Ghorbani et al. (2020), in which they examined the quality and speed of second and third grade students' handwriting, it was concluded that gender differences did not have a significant effect on handwriting legibility and writing speed. In these differences between researchers, it can be said that with the fact that writing skills are specific to each student, female students are developmentally better than male students in fine motor skills (Unutkan, 2006; Başaran, 2020) and that this affects the legibility of handwriting.

According to the results obtained in the research, the handwriting legibility of the first-grade primary school students did not differ significantly according to the writing tasks. The fact that students wrote by listening (dictation) or by looking (copying) did not make a significant difference to the legibility of the text. In some studies, on the legibility of writing (Okatan & Özer, 2020), different results can be seen. In their study in which they examined the writing skills of first grade primary school students, Okatan and Özer (2020) evaluated the writing exercises of 25 first grade students and concluded that the students' handwriting legibility scores in the copying exercise were higher than their handwriting legibility scores in the dictation and free writing exercises.

According to another result obtained in the research, the handwriting legibility of the first-grade primary school students did not differ significantly according to the type of school. The fact that students were educated in a private or state school did not make a significant difference to their handwriting legibility. This situation can be interpreted as the fact that teachers gave importance to the content rather than to the formality of the writing in the distance education process during the pandemic.

According to the results of the research, the writing errors of the first-grade primary school students showed a significant difference depending on the writing task (copying-dictation). When the types of errors made by the students were evaluated in general, it was concluded that the most common types of errors were letter confusion, word omission/insertion and spelling mistakes, and that these types of errors were much more common in the dictation task. In studies on the writing errors of first grade primary school students (Ulu, 2019; Babayiğit, 2019; Balkan, 2015; Memiş & Harmankaya, 2012; Akyıldız, 2011), the most common types of errors made by the students show similarity. As a result

of the study in which she examined the handwriting legibility and writing errors of first grade primary school students Ulu (2019) stated that the students mostly made spelling mistakes, followed by letter omission/insertion, syllable omission/insertion, letter confusion, and word omission/insertion errors, respectively. Likewise, in his study, Babayiğit (2019) classified students' errors as inappropriate spacing between letters, missing letters, excess letters, changing letters, not writing letters in alignment, and adding syllables. According to the research results, the reason why first grade primary school students who learn to read and write in the shadow of the pandemic make more mistakes in their dictation exercises can be interpreted as not being able to adequately practise the writing knowledge they have acquired in the distance education process and inability to allocate much time to the teachers' dictation exercises. In dictation studies, which require a much higher cognitive process than the copying (writing by looking) writing task, the extent to which the writing knowledge has been acquired gains importance here since students are content with just hearing. This is because dictation studies are regarded as studies that are used to understand students' writing levels and to check whether a rule has been learned or not (Nas, 2003).

Another result obtained in the study is that the writing errors of first grade primary school students did not show a significant difference according to gender. It can be said that male and female students made mistakes in their written texts at similar rates. Similar results (Öğüt, 2018) were obtained in some studies made with regard to writing errors, whereas different results were obtained in others (Balkan, 2015). In her study examining the writing errors and legibility of primary school students, Öğüt (2018) concluded that first grade students made mistakes in their written texts in letters, words, sentences and in the overall text at similar rates, regardless of gender. Contrary to this, Balkan (2015) conducted a study with first-year primary school students, and it was determined that when writing cursive script, first-year students studying in mixed classes formed according to their birth months made more errors in writing the letters on the lines and in combining letters that should not be combined. In general, it was determined that as age increased, writing errors decreased, that the errors of students who had received preschool education were fewer in number, and that female students made fewer errors than male students.

According to the results obtained in the research, the writing errors of the first-grade primary school students showed a significant difference according to the type of school (state-private). The fact that students studied in a private or state school created a significant difference in writing errors. When evaluated in terms of error types, it is seen that the type of school was effective on students' writing errors in letter omission/insertion, letter confusion, syllable separation at the end of the line, and total error score. This can be interpreted as the fact that students studying in private schools make fewer errors due to having more opportunities (greater number of course hours, better access to distance education, etc.), and that because there are fewer students in classes compared to state schools, they receive more frequent feedback from their teachers about their writing due to the opportunity to deal with students one-on-one.

In general, when both the legibility and writing errors were evaluated, it was seen that the students' writing skills were not at a sufficient level as a result of the research. This situation gives a clue about the effect of distance education on the development of writing skills. As a matter of fact, in the research conducted by Karakuş, Esendemir, Ucuzsatar and Karacaoğlu (2021) on the views of parents on primary education literacy teaching during the pandemic period, parents stated that the least supported skill area in the distance education process was writing skill. Kaplan and Gülden (2021), in their study on the evaluation of Turkish education in the distance education process, stated that the majority of teachers found that writing skills were most negatively affected during the epidemic. They stated that the reason for this was that the activities for writing skills could not be adequately controlled. In another similar study, teachers stated that since the studies on writing skills were carried out with limited opportunities in the distance education process, it was not possible to determine the mistakes and work on these mistakes again adequately (Günaydın, 2021).

As a result, although the results obtained in this study are similar to the results of other researches on writing legibility and writing errors carried out in the face-to-face education process, it is seen that the pandemic process has had a devastating effect. Considering that the distance education process will also be a part of education life in later periods, research studies on the adequacy of the distance education process for fostering basic skills can be included in order to advance this process more beneficially, especially in primary school.

LIMITATIONS AND RECOMONDATIONS

This research has some limitations like other researches. This research is limited to the writing task, school type and gender variables of handwriting legibility and writing errors of 211 first grade primary school students studying in two state and two private schools in the city centre of Konya. At the same time, two narrative texts common to all students were used.

In this study, students' handwriting legibility and writing errors were discussed according to various variables. In future studies, handwriting legibility and writing errors can be discussed and examined together with factors affecting writing skills such as visual perception skills, pencil grip position, and attention deficit. The research was carried out with first grade primary school students who were learning to read and write through distance education during the pandemic period. The effect of distance education on handwriting legibility and writing errors at other grade levels can be investigated. Within the framework of the results obtained, different activities can be designed for writing skills in distance education. Only quantitative data were analysed in the study. In future studies, the framework of the research can be expanded by considering the views of teachers and parents.

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APPENDICES

Appendix 1. Dictation and Copying Texts

A FEAST DAY WITH MY GRANDFATHER

My father was very happy when he came home in the evening.

"Your grandfather is coming to visit us during the holidays", he said. My sister Ezgi and I were very happy with this news.

My grandfather came early in the morning of the day before the feast. I ran and hugged my grandfather. On the morning of the feast, we all had excitement and smiles on our faces. My grandfather and uncle gave me and my sister holiday pocket money. We had a long talk with my grandfather and uncle that day. Our relatives came to celebrate the feast with us. We had a lot of fun that day.

Cuma KARATAŞ

(First grade Turkish coursebook)

Abridged.

TOMBIK'S REGRET

In the depths of the forest lived a tiny elephant calf named Tombik. Tombik sometimes got so caught up in a game that he didn't even realise he had wandered away from his family. Although his parents said that there were many dangers in the forest, Tombik did not pay much attention to what was said.

One day, Tombik was chasing a yellow butterfly. He tried to catch her. While trying to catch the butterfly, he wandered away from his family and got stuck in a swamp. Tombik shouted around to ask for help. But no one heard him.

(I Understand What I Read With Tales and Stories)

Abridged.

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Study of Developing Stereotyped Thoughts Scale Toward Science Courses [1]

Bayram Irmak [2] **Mutlu Pınar Demirci Güler** [3]

Abstract:

The study aims to develop a scale for determining the stereotyped thoughts of primary school classroom and elementary science teacher candidates toward science courses. Descriptive survey model, one of the quantitative research patterns, is used since the study follows the process of scale development. In sample determination, first stratified sampling and then easily accessible sampling method are used. The study groups consist of 611 pre-service teachers, wherein 302 was for Exploratory Factor Analysis (EFA) while 309 was for Confirmatory Factor Analysis (CFA). For the validity of the scale, the number of content validity rate (CVR) was determined in line with the opinions of 14 experts and the scale items were arranged. For the construct validity of the scale, EFA was performed and total item correlation and item factor loadings were found to be at the desired level. As a result of the validity-reliability analysis of the study by adopting a Likert-type scale development model, a 28-item scale structure with Cronbach alpha internal consistency coefficient .81, consisting of five factors, was obtained, which explains 58.63% of the total variance.

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1 This article is derived from Bayram Irmak's master thesis entitled "Development and implementation of stereotyped thought scale for science courses" conducted under the supervison Mutlu Pınar Demirci Güler.

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INTRODUCTION

Science lessons are aimed to prepare a person for life and for attaining the capacity to produce solutions by making sense of the difficulties that will arise in his/her lifetime. Important skills from science are gained via participation of a person in the process of structuring the knowledge according to method of reasoning and habits, by doing and living, doing research, and continuing studies in science processes. A student, who decides to get a bachelor's degree in science in Turkey's education system, receives 14 years of science education starting from the 3rd grade in primary school to his/her final year of bachelor's degree., despite such a long education period, it can be seen that many factors, such as the following, are in place:unorganized educational approaches that lack the requirements of modern times,intensive science education and curriculum,inadequate readiness of teachers in line with certain qualification levels or teachers' lack of knowledge and skills,inadequate use of learning-teaching method and technical and measurement-evaluation methods in terms of impact,overcrowded classes, and lack of materials used to transfer information (Baş, 2015; Keser, 2005) are described as the reasons of student's failures in science courses.

When the reasons for the failure in science education are examined in terms of teachers; it was found that teachers are not prepared to teach science education content areas, teachers who have more experience in science education perceive themselves superior than new graduates and are not open to innovation, teachers do not trust themselves in the field of science and technology, teachers have regarded themselves as inadequate in scientific process steps during the science education, and teachers' insufficient conceptual knowledge in the process of learning and teaching (Baş, 2015; Radford, DeTure & Doran, 1992; Carin & Sund, 1989; Downing & Filer, 1999). If the reasons for the failure in science education are analyzed from student sources; it may be stated that it is not correct to consider only the absence of scientific awareness as a predictor of the failure of students in science lesson (Watter, Ginns, Neumann & Schweitzer, 1994), but also affective variables that influence individuals' science literacy levels (Zor, 2020). The most significant variables influencing involvement in the course are: the attitudes of the students toward science, their degree of enthusiasm, motivation and communication. (OECD, 2016; Osborne, Simon & Collins, 2003; Schibeci, 1984; Baş, 2015; Zorluoğlu, Olgun & Kızılaslan, 2020). The concepts of communication and non-communication come out as influences impacting individuals' accurate interpretation of the process and their self-expression in the process of involvement in the lesson (Demiray, 2008; Özkul, 2020).

Communication can be defined as the process of transmitting information and common understanding from one person to another (Keyton, 2011). A problem in any one of these elements can reduce communication effectiveness (Keyton, 2011) and cause lack of communication. Lack of communication is defined as not being able to receive the message to be transmitted or getting it wrong (Hanks, 1999). There are many factors that cause lack

of communication. These factors, are expressed as process barriers, physical barriers, semantic barriers, and psychosocial barriers (Eisenberg, 2010) and the thoughts of the people who communicate (Dökmen, 1997). The thoughts of the individuals are the sources that direct the emotions and behaviors of the person, that is to say, directing the life of the individual. The main reason that constitutes the final situation is the thought patterns of an individual. Thought patterns are mostly expressed as stereotypes in daily life (Orhon, 2013) and stereotyped thought was drawn up as perceptions and thoughts about the person, nation, or culture that are often wrongly formed, simplified, and generalized (Berkant & Baysal, 2020). Thoughts that shape the emotions and behaviors within certain patterns that are not functional in individuals (Baş, Tay & Işık Tertemiz, 2021), and he defined these thoughts as stereotypes (Pretzer & Beck, 2004). Stereotypes are "*widely-accepted, culturally shared beliefs describing personal traits and characteristics of groups of individuals*" (Ramasubramanian, 2011), and often distorted "pictures in our heads" which refer to phenomena and people (Lipmann,1922). Stereotypes are sometimes overgeneralized, inaccurate, and resistant to new information, but can sometimes be accurate (David,2013). A person can embrace a stereotype to avoid humiliation such as failing a task and blaming it on a stereotype (Burkley, Hart, 2008) and enable them to "*make sense of their worldly encounters*" (Hager, 2010: 127). Stereotypes can affect self-evaluations and lead to self-stereotyping (Cox, Abramson & Lyn, 2012), Correll (2001, 2004) such that men assess their own task ability higher than women performing at the same level found that specific stereotypes (*e.g., the stereotype that women have lower mathematical ability*).

Beck (1979) classified the identified stereotypes in seven sub-dimensions: arbitrary inferences, selective abstraction, over-generalization, exaggeration/underestimation, personalization, labeling and mislabeling, and polarization.

There are different studies in the literature on the classification of stereotypes (Beck, 1979; Burn, 1980; Blackburn, 2011; Dökmen, 1997; Köroğlu, 2012; Özer, 2013). General concepts encountered in these studies are as follows:

•*Over-Generalization*: The individual creates general beliefs and thoughts by looking at only one event.•*Black or White / All or None / Polarization*: It involves thinking and interpreting every situation and event as "*all or none*" or looking at things on the verge of "*black and white*".•*Personalization / Emotional Explanation*: It is the relationship of the individual with himself/herself in matters or incidents for which he/she is not responsible.•*Absolutism / Have To/Must Rules / Should-Have Logic:*It is a type of thought mostly stereotyped by normative individuals. They feel unhappy when they go beyond these rules. •*Sacrifice Mobilization / Excessive Sacrifice:* The individual tries to change/sacrifice himself/herself for someone else. •*Exaggeration / Hellfire Preaching / Enlargement / Focusing on Negative Thinking / Competence:* The individual gives more importance to a situation or event than it should be. •*Underestimating / Ignoring the Positive*: The individual gives less importance to a situation or event than it should be. •*Arbitrary Inferences / Jumping to Conclusions / Fortune Telling:* The individual tends to conclude without any evidence. •*Selective Abstraction / Mind Reading:* When an individual is evaluating an event, he/she pays attention to minor details and concludes by

taking this detail as a guide. •*Labelling and Mislabeling / Stigma*: It involves defining/qualifying an individual according to his/her past mistakes.

Stereotypes of individuals can be positive or negative. While positive stereotypes generally cause fewer communication problems among individuals, negative stereotypes cause more problems for individuals (Pretzer & Beck, 2004). In this sense, addressing negative stereotypes has become essential for the solution of problems. In this context, the communication that students have with their peers, as well as with their teachers, is effective in the natural development of self-esteem and self-expression competencies. Monitoring the success of individuals who can express themselves during lessons is more difficult and complex than those who cannot. At this point, it is mandatory to establish a classroom environment which is democratic and open to communication in the course of the lesson to ensure healthy communication for the teacher and peers (Edwards, 1997; Şimşek, 2003).

Purpose of the research

This research was analyzed according to the framework of cognitive therapy founded on the stereotyped thought patterns of Beck (1997). In this context, this research is a significant study in terms of identifying stereotypes that arise from the factors that cause failure in science courses. The study is scale development and identifying pre-service teachers stereotypes at university level with the developed scale.

METHODS

This study is a scale development study aiming to develop the stereotyped thinking scale for science lessons in pre-service teachers.

Research model

Descriptive survey model, one of the quantitative research patterns, is used since the study follows the process of scale development.

Research universe and sampling

The universe of the research consists of two different study groups, including pre-service teachers studying in the fields of classroom education and science education in the 2018-2019 academic year at Kırşehir Ahi Evran University and Mersin University Education Faculties. Data from the first study group is used for Exploratory Factor Analysis (EFA), while data from the second study group is used for Confirmatory Factor Analysis (CFA).

More than one study group has been created by considering multiple elements in the formation of the study groups, and multiple sampling methods has been adopted in the creation of these study groups. In this context, stratified sampling, a probabilistic sampling method, is used. The second stage of the sample selection aimed to create study groups with similar characteristics by using convenience sampling method for working groups where EFA and CFA are applied (Büyüköztürk et al., 2018: 94).

The first study group consists of 302 pre-service teachers studying at Kırşehir Ahi Evran University; 232 are female while 70 are male. The group is formed through the

homogeneous sampling method and convenience sampling method. Two-hundred twenty-four pre-service teachers of this group are classroom education teachers and 78 of them are pre-service science teachers. According to Tabachnick and Fidel (2015), the number of samples required for exploratory factor analysis should be at least 300 participants. In this study, the sample size can be considered as a good level, since data were obtained from 302 people for exploratory factor analysis. The second study group is formed through the homogenous sampling and convenience sampling method. The group consists of 309 pre-service teachers studying at Mersin University, wherein 246 are female and 63 are male. Two-hundred pre-service teachers of this group are classroom education teachers and 109 of them are pre-service science teachers.

Development of the data collection tool

Various questions must be answered, and some decisions must be taken before starting the measurement tool development process (Cohen & Swerdlik, 2005). The process of developing a Stereotyped Thought Scale for Science Courses was started by scanning the relevant literature (Erkuş, 2007; McGartland et al., 2003; Torgerson, 1958; Yurdugül, 2005). Based on the sources reached, the first phase was developed within the scope of YÖK/World Bank National Education Development Project (YÖK, 1997); twelve transactional step called "*determining the structure, examining related researches, determining their size, deciding the question format, producing questions in accordance with the format, getting expert opinion on questions, calculating coverage validity indessiges, reviewing questions, implementing EFA, reviewing questions and finalizing testing, analyzing CFA application and test data, and factor structure reporting*" were put to work.

In this context, a comprehensive study of international and national literature was conducted to develop a valid and reliable measurement tool to be used in determining the stereotyped thoughts of pre-service teachers for science courses, and a scale was drafted from a large pool of 128 articles. Care has been taken to create items to include all dimensions of stereotyped thoughts. It was decided that the scale to be developed for the study should be prepared in Likert-type rating scale developed by Likert (1932), which is used more frequently and more widely than other scales in measuring many personality traits in social sciences (Oppenheim, 1979; Judd, Eliot, & Kidder, 1991; Fraenkel & Wallen, 2003; Sommer & Sommer, 2002: as cited in Tezbaşaran, 2008). Considering the age level of the pre-service teachers, the scale was prepared in a 5-point Likert type (Adelson & McCoach, 2010; Bourke & Frampton, 1992). An 85-point draft form was prepared with the elimination of items that are similar between expressions and are estimated to have repeated, low relationships. This draft form, which was created during the development of the Stereotyped Thought Scale for Science Courses for the content validity study of the research was presented to a total of 14 field experts, including seven teachers and seven academicians specializing in educational sciences, measurement and evaluation, psychological counseling and guidance, and Turkish language. The process of creating a pool of matter is defined as a process in which behaviors are measured in terms of inclusion with the universe (DeVellis, 2016). As a result of the expert opinion study conducted with the forms presented to the experts, the substances receiving negative opinions were

removed from the scale; the number of articles of the draft vehicle was reduced to 67 and they were prepared for pre-application.

Ethical considerations

In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics", which is the second part of the directive, were not taken.

FINDINGS AND CONCLUSION

Validity and Reliability Studies

Within the scope of validity studies, view validity, and scope validity for interpretive validity, validator factor analysis and explanatory factor analysis using structural equality modeling for structure validity were looked at. Within the scope of trust studies, Kaiser-Mayer-Olkin (KMO) and Bartlett Test result for consistency, Kuder-Richardson (KR) trust coefficients and Cronbach alpha Confidence coefficient were looked at for internal consistency.

Exploratory Factor Analysis (EFA)

In scale development studies, the data set to be analyzed for exploratory factors should have a normal distribution (Özdamar, 2016). Otherwise, correlation-based relationships that allow factor analysis will not emerge (Can, 2017). In this context, the normality distribution of the data set was examined first.

After examining the distribution of normality, exploratory factor analysis was performed. Exploratory factor analysis is a type of statistical analysis that aims to combine variables of similar nature and explain this measurement with fewer factors in order to determine the theoretical constructs in which the variables in the data set are constructed and to what extent these theoretical structures represent variables (Büyüköztürk, 2018; Henson & Roberts, 2006).

In the study, during the exploratory factor analysis performed on the data obtained from 302 pre-service teachers, 232 females and 70 males in total, it was observed that the factor values were at least .40, and the difference between two factors was at least .10 during the distribution of an item to more than one factor (Büyüköztürk, 2018; Tabachnick & Fidell, 2015). After which, 67 items were subjected to Principal Component Analysis. Since sub-factors were thought to be related to each other within the framework of the concept of stereotyped thoughts, Direct Oblimin rotation method was used (Can, 2017; Çokluk, Şekercioğlu & Büyüköztürk, 2018).

As a result of the analysis in the study, the KMO value is 0.891, and as a result of Bartlett's Test of Sphericity, chi-square value is 4050,533 (p <.001). Bartlett's significance value indicates that the data is derived from a multivariate normal distribution (Thompson, 2004; Hair et al., 2013: 34; Morgan et al., 2011: 51). In light of the above information, it can

be said that the data set used in this study is suitable for exploratory factor analysis (Büyüköztürk, 2018). After checking the KMO and Bartlett Sphericity tests, an exploratory factor analysis was performed. The Scree Plot chart, which gives the eigenvalue and factor numbers, is given below and is used for identifying the number of factors.
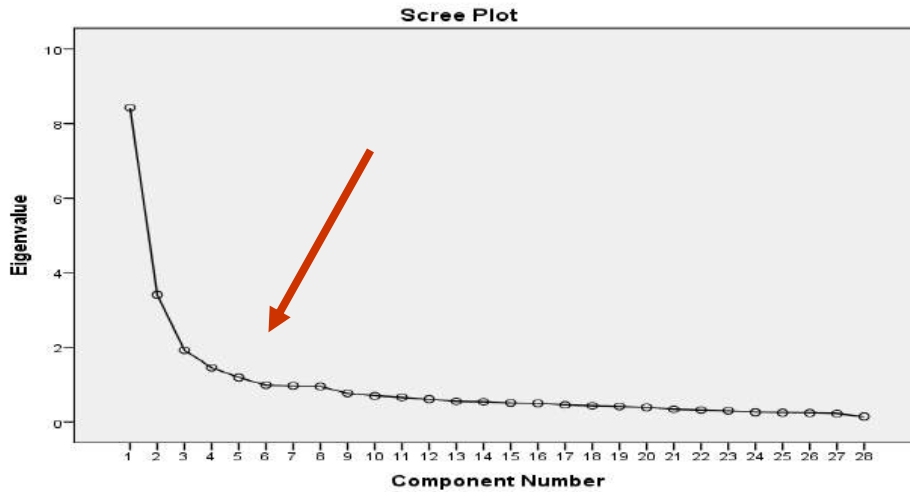
Figure 1. Scree Plot Chart Showing the Dimensions of the Scale.

When the Scree Plot Graph is examined, the graph curve becomes horizontal after 5 declines. This situation suggests that the SSTS has 5 factors. Also, when the total variance table is examined, the variance values of the factors following 5 factors have approximate and low values.

The oblimin axis rotation method is frequently used in scale studies in social sciences (Cohen, Manion & Morrison, 2007). This rotation technique is performed to ensure the independence, easier interpretation and significance of the factors obtained in EFA (Büyüköztürk, 2018). Following the rotation technique, it is observed that it has a 5-factor structure with eigenvalue greater than 1. While determining the items of the scale, the eigenvalues should be at least 1 and the load values of the items should be at least .40. It is also noted that the items are included in a single factor and there is at least .10 difference between the factors in the two factors. As a result of factor analysis, on a scale of 67 items, 39 items in total are removed from the scale since 31 of the items (I1, I8, I10-I13, I18-I21, I30, I32-I35, I41, I42, I44-I50, I56-I61, I66) have low factor load, 8 of them (I5, I6, I23, I24, I27, I37, I39, I67)are located under more than one factor, as a result it was decided to exclude these items from the scale (Lawshe, 1975).

Table 1

Factor Structure of Items, Variance Levels and Item Total Correlation Values

Items	1.Factor	2.Factor	3.Factor	4.Factor	5.Factor	T.I.Cor.
I-43. I am always tensed when I need to solve science questions general exams.	.805					.591
I-40. Science is very difficult, so I think I do not want to deal with science topics.	.709					.649
I-38. When I do something wrong in science lessons, I think I will be ashamed.	.634					.613
I-22. Fear of not being able to succeed in science lessons is always a cause of unhappiness for me.	.632					.457
I-9. I can never understand science courses.	.626					.736
I-25. Science course exams are difficult.	.616					.404
I-29. Whenever I want to learn new information about science, I immediately get bored and look for other things.	.611					.468
I-7. I believe that I can't be successful in science lessons even though I work for it.	.596					.709
I-28. I always think that I will repeat the same mistake in science lessons.	.579					.631
I-26. Questions never came from the well-studied topics	.495					.520
I-53. Those who can experiment in science classes are more popular.		.858				.737
I-51. Those who are successful in science lessons are more popular than the others.		.744				.634
I-52. Those who can relate science subjects to daily life are more sophisticated.		.667				.539
I-54. Faculty members who teach science courses in the laboratory are more ambitious in their field.		.598				.618
I-2. Science lecturer teaches lessons with hardworking students.			.814			.598
I-17. I fail because I am not appreciated in science lessons.			.702			.644
I-36. When the science lecturer says that I can do, I think he makes fun of me.			.666			.662
I-55. Male students are more successful in science lessons and courses.			.657			.596
I-14. Since I am afraid of not delivering the result, I cannot experiment in science.			.656			.743
I-31. When science courses become concrete, then everyone can understand easily.			.501			.582
I-62. A student is either successful or unsuccessful in science lessons.				.688		.532
I-65. I must get high scores from the exams to teach science subjects in the future.				.672		.568
I-64. I must know all the terms in an experiment to understand it.				.532		.505
I-63. If I do not get the first place in science exams, I will be unsuccessful.				.452		.525
I-15. My lecturer is also responsible for the low scores I get in science lessons.					.682	.492
I-3. I cannot be successful in this course unless the teaching method changes.					.652	.562

I-4. I cannot be successful in this course unless the science course is taught in a laboratory environment.	.617	.598
I-16. The difficult subjects make me think that learning this course is very difficult.	.523	.503

* Old item numbers are given in parentheses.

In the consequence of the exploratory factor analysis performed to determine the factor structure of the scale, structure consisting of five dimensions and 28 items is formed either by removing the items with factor load below .40 or items with approximate loads in two dimensions. As a result of the principal components analysis, it is seen that there are five factors with eigenvalues greater than one. When these factors are examined, the eigenvalue of the 1st factor is 8.427, the 2nd factor is 3.410, the 3rd factor is 1.926, the 4th factor is 1.459 and finally, the 5th factor is 1.195. The entire five-factor structure explains 58.63% of the total variance (Kline, 2005; Büyüköztürk, 2018). Another result is the total correlation coefficients of the items. When these results are analyzed, the total-item correlation of the items is between 0.404 and 0.743. Öner (1997) suggests that the total-item correlation related to the total item correlation should be above 0.30. In the research, item discrimination levels of scale items were examined after performing exploratory factor analysis for scale items. In order to determine the internal consistency of the scale items, the t-test of the lower 27% and upper 27% groups of the data belonging to the exploratory factor analysis study group was performed, and according to the results, there was a significant difference between the lower 27% and upper 27% groups of the 18 items in the scale (p<0.05). According to these results, the item discrimination levels of the scale items were appropriate (Büyüköztürk, 2002). When the current study results are examined, the item-total correlation scores of the scale are in the desired interval.
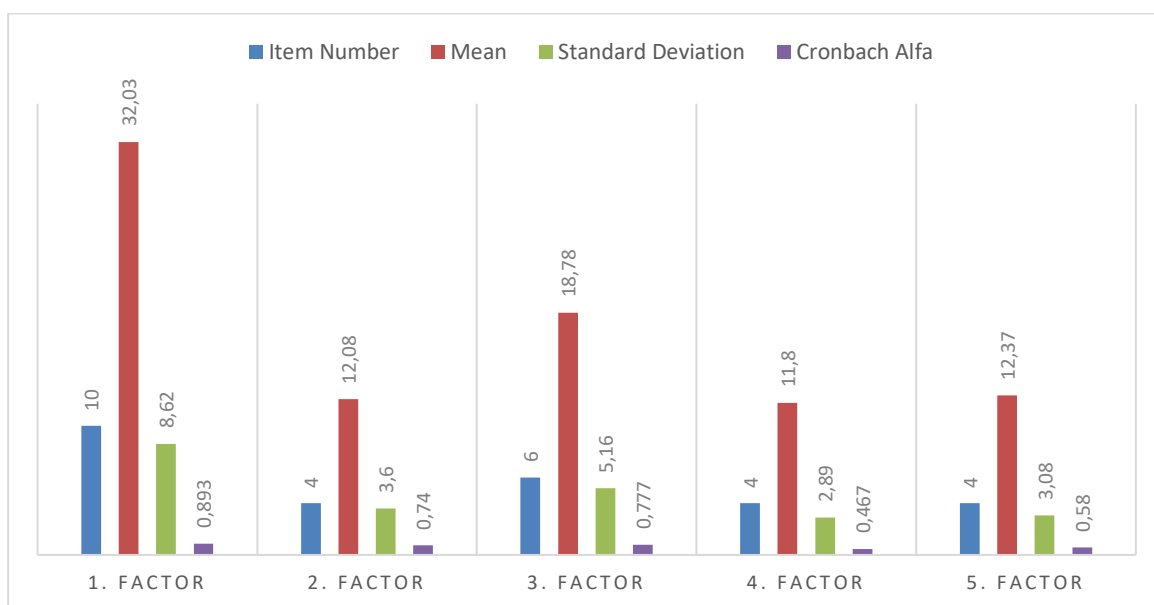
Figure 2. Item Numbers, Mean Scores, Standard Deviations and Cronbach Alpha Internal Consistency Coefficients of Factors

When Figure 2 is examined, the number of items in the scale, mean scores, standard deviations, and Cronbach alpha internal consistency coefficients are seen. It is observed that the mean of the 1st factor is 32.03 (SS = 8.62), the 2nd factor is 12.08 (SS = 3.60), the 3rd factor is 18.78 (SS = 5.16), the 4th factor is 11,80 (SS = 2.89), and 5th factor is 12.37 (SS = 3.08). Cronbach alpha internal consistency coefficients of the scale are .893, .740, .777, .467, and .580, respectively. The Cronbach Alpha interval can be expressed as $0.40 \leq a < 0.60$ reliable, $0.60 \leq a < 0.90$ quite reliable, and $0.90 \leq a < 1.00$ highly reliable (Özdamar, 1999; Tavşancıl, 2006: 29). From this point of view, it has been observed that the measurements obtained from SSTS are at an acceptable level for many dimensions, but lower than the expected level for one dimension.

Confirmatory Factor Analysis (CFA)

While the factor structure of the data is determined based on factor loads without any particular preliminary expectations or experiments in EFA, CFA is based on testing a prediction that certain variables will predominantly be placed on predetermined factors based on a theory. Many fit indexes are used to demonstrate the adequacy of the model tested for compatibility in DFA. These are Chi-square fit test (Chi-square Goodness), Goodness of Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), and Adjusted Goodness of Fit Index (AGFI) (Seçer, 2017: 189).

Table 2

Confirmatory Factor Analysis Results

Index	Excellent	Acceptable	Research Findings	Results
$X^{2/df}$	0 – 3	3 – 5	2.68	Excellent
RMSEA	.00 – .05	.05 – .08	.07	Acceptable
SRMR	.00 – .05	.05 – .10	.08	Acceptable
CFI	.95 – 1.00	.90 – .95	.93	Acceptable

It is suggested that the value of $\chi 2$, which is obtained by dividing $\chi 2$ value by degree of freedom, should be below two, three, or five (Bollen, 1989). RMSEA index below .05 indicates excellent data fit, whereas RMSEA index between .05 and .08 indicates acceptable data fit. Models with RMSEA $\geq$ .10 are rejected due to poor model-data fit. Besides, it is recommended that the CFI value is .90 and above (Hu & Bentler, 1999). Standardized Root Mean Square Residual (SRMR) value is requested to be under .10 (Kline, 2005). Other indices do not need to be used and reported (Brown, 2006; Kline, 2005). According to the results obtained, confirmatory factor analysis and confirmatory factor analysis results are confirmed.

Chi-Square=912.14, df=340, P-value=0.00000, RMSEA=0.074
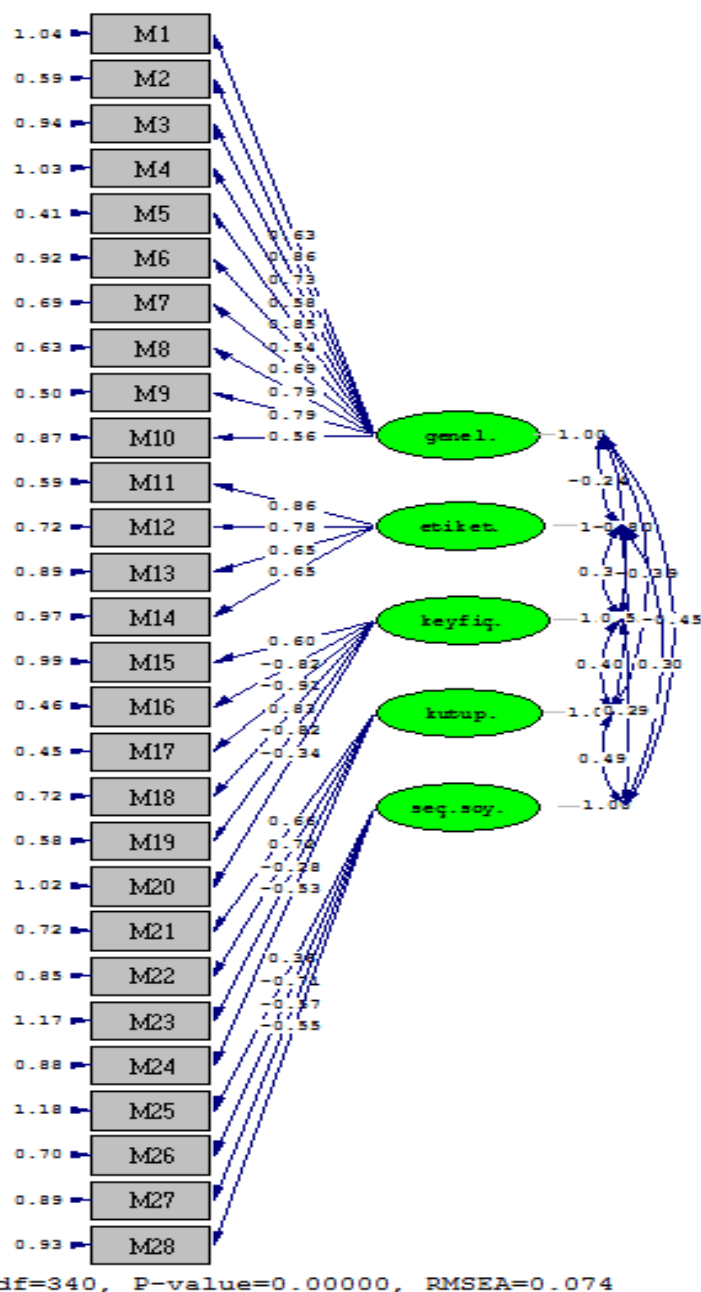
Figure 3. Confirmatory Factor Analysis Path Diagram

When Figure 3 is examined, the absence of red arrow in t values demonstrates that all items are significant at the level of .07. It was determined that the factor load values were over 30. A review of standard factor loadings for analysis shows that factor loads for all items are higher than 30 (Seçer, 2017). Also, X2 = 912.14, df = 340, X2 / df = 2.68. According to Sümer (2000), the fact that this ratio is below three indicates that it is in an excellent fit.

The Reliability of the Stereotype Scale Toward Science Courses

There are several ways to estimate reliability. One of these is the Cronbach's alpha reliability coefficient, which indicates the consistency of the single measurement without the need for multiple applications (Can, 2017). In this study, the internal consistency process is performed for the reliability of SSTS, and the obtained values are shown in Table 3.

Table 3

Internal Consistency Reliability Coefficients of SSTS

SSTS and Sub-dimensions	Cronbach's Alpha
SSTS	.819
Over Generalization	.893
Labelling	.740
Arbitrary Inference	.777
Polarization	.467
Selective Arbitration	.580

As seen in Table 3, the Cronbach Alpha internal consistency coefficient was examined for the reliability analysis of the scale consisting of 28 items and five sub-factors, and its value was found to be .81. In this context, the reliability of the scale is high (Büyüköztürk et al., 2018). The internal consistency coefficients are found as .893 for the first dimension, .740 for the second dimension, .777 for the third dimension, .467 for the fourth dimension, and .580 for the fifth dimension. It is observed that the measurements from the SSTS are acceptable for many dimensions; however, it is lower than the expected level for one dimension, and the internal consistency coefficients of the factors of "Polarization" and "Selective Arbitration" are at an acceptable level because they are higher than .40 (Tavşancıl, 2006).

Technical Properties of the Stereotype Scale Toward Science Courses Suggestions

The Stereotype Scale Toward Science Courses, which aims to determine the stereotypes of pre-service teacher toward science courses (Beck, 1979), was prepared in five-point Likert type. Positive and negative items on the scale are scored as they are; in other words, negative items are not subject to rotation. Every item on the scale predicts stereotypes, whether they are positive or negative statements. The scale, consisting of 28 items, has five sub-dimensions. There are ten (10) identified items, between 1-10 in the first dimension called excessive generalization, four (4) items between 11-14 in the second dimension called labelling, six (6) items between 15-20 in the third dimension called arbitrary inference, four (4) items between 21-24 in the third dimension called polarization, and four (4) items between 25-28 in the third dimension called selective abstraction.

DISCUSSION AND SUGGESTIONS

Deciding on the measurement tool development process underwent a very difficult brainstorming. First of all, it has been observed that university students develop a negative attitude toward science courses, talk about the difficulty of science courses, constantly find an excuse for their level of success in science courses, and affect themselves and those

around them with irrational observations such as "I cannot succeed even if I study science courses." In addition, it was stated that the graduates of classroom education mostly hesitate to teach science lessons when they start working (Özdemir, 2006). If we look at countries in general, this situation is clearly seen in the success result table in international exams (TIMMS, 2011; 2015; 2019; PISA, 2015; 2018). Considering these situations, it is seen that the pre-service teachers, who will build the future, have some irrational and unrealistic stereotypes toward science classes. Studies have shown that students who have a positive attitude toward science classes have higher academic achievements (Altınok, 2005; Balım, Sucuoğlu & Aydın, 2009; Bloom, 1995; Demirbaş & Yağbasan, 2004; Dieck, 1997). For this reason, it is important to work to determine the stereotypes of pre-service teachers against science and to eliminate the negativities.

In the process of developing the scale, the steps of the process established within the scope of YÖK / World Bank National Education Development Project (YÖK, 1997) were followed.

The stereotyped thoughts and dimensions, which are the sub-principles of the Cognitive Behavioral Therapy Theory developed by Beck (1979) at the stage of determining the structure, form the basis of the study. Many national and international publications have been reached in the context of related research (Carels et al., 2015; Griffiths & Christensen, 2007; Levy et al., 2002; Park et al., 2019; Saxena, 2008; Sherman, 1996; Arkar, 1992; Ünal, 2015; Dağıstan, 2017; Dağıstan & Çalışkan, 2018; Nimbi et al., 2018; Van den Bos & Stapel, 2012; Macrae, Bodenhausen & Milne, 1998; Kodan, 2013). Macrae, Bodenhausen, and Milne (1998), in the study titled "Saying No to Unwanted Thoughts: Self-Focus and Regulation of Mental Life", revealed the situation of the reduction of stereotyped thoughts that increase in society with the model of self-regulation of cognitive and mental control mechanisms. The results of this study shed light on the writing process of this article.

Likert-type question format was determined for measurement. Considering the age level of pre-service teachers, it was decided to prepare the scale in five-Likert type (Adelson & McCoach, 2010). As stated by Erkuş (2007), a group of questioners' thoughts on the subject were taken as a prerequisite before starting to form questions in accordance with the format, and a wide item pool of 128 items was created by taking into account the age and education levels of the target audience, university students. A draft form consisting of 85 items was prepared by eliminating the items with similarity between the expressions, repetition, and low correlation. For the validity of the content, written opinions were received by sending a "substance expert opinion form" from 14 field experts. Subsequently, the content validity rate (CVR) and content validity index (CVI) were calculated, and items with a (CVR) value lower than 0.571 were excluded from the test (Lawshe, 1975; Demiralp & Kazu, 2012). In the light of expert opinion, the draft form with 85 items was reduced to 67 items; the form, which was ready for pre-application, was applied to 302 students in the first stage. Nunnally (1978, cited in DeVellis, 2016) suggests that 300 people are sufficient for the sample size. However, it is stated that the Kaiser-Mayer-Olkin test should be performed in deciding the

sample size for factor analysis; this test should give a value higher than .60 and the Bartlett test should be statistically significant (Büyüköztürk, 2018). In the current study, KMO value as a result of the analysis was 0.891. As a result of Bartlett's Test of Sphericity, the chi-square value was found to be 4050,533 (p <.001). The significance of Bartlett's value shows that the data come from multivariate normal distribution (Thompson, 2004). In the light of the above information, it can be said that the data set to be used in this study is suitable for exploratory factor analysis. It is seen that the item-total correlation values for all items in the scale vary between .404 and .743. According to Seçer (2017), the item factor load is recommended to be at least .30. As a result of the factor analysis, in the scale consisting of 67 items, a total of 39 items were excluded from the scale because 31 of the items had low factor loading and eight were under more than one factor. As a result of the analysis, a structure consisting of five dimensions and 28 items has been reached as a result of the factor analysis repeatedly performed by removing the items with a factor load of less than .40 and which are close to each other in two dimensions. As a result of the principal components analysis, it is seen that there are five factors with eigenvalues greater than one. When these factors are examined, it is seen that the eigenvalue of the 1st factor is 8.427, the eigenvalue of the 2nd factor is 3.410, the eigenvalue of the 3rd factor is 1.926, the eigenvalue of the 4th factor is 1.459, and the eigenvalue of the 5th factor is 1.195. In addition, Factor 1 made 30.09% of the total variance, Factor 2: 12.18%, Factor 3: 6.87%, Factor 4: 5.20% and Factor 5: 4%. It explains 26 of them. It is seen that the entire five-factor structure obtained explains 58.63% of the total variance. Kline (2005) states that the variance rate explained with the measurement tool should be at least 40%. It is seen that the scale explains 58.63% of the total variance and this value is above the specified limit. It shows that the five factors that make up the stereotyped thought scale for science have a correlational relationship with each other and the values are between .27 and .54. According to Seçer (2017), a correlation coefficient of .90 and above between each factor is not recommended, as it will indicate the multiple correlation problem. Therefore, the values obtained show that the scale does not have a multicollinearity problem.

As a result of the data obtained from the exploratory factor analyses, renaming was not required when the items under the factors were examined, and the Factor named by Beck (1979) as Overgeneralization, Labeling, Arbitrary Inference, Polarization, and Selective Abstraction sub-dimensions are used. The scale was finalized by testing the relationship of factors with one another with confirmatory factor analysis. In the confirmatory factor analysis results, the value of χ2 was found to be 2.68. In the confirmatory factor analysis results, it is recommended to be two, three, or less than five for the value obtained, by dividing the value of two by the degree of freedom (Bollen, 1989). As the research finding is below three, it is at an excellent level. RMSEA index was found .07. Having RMSEA index below .05 gives perfect data fit; being between .05 and .08 indicates an acceptable fit. Models with RMSEA ≥ .10 are rejected due to poor model data fit (Browne & Cudeck, 1993). The research findings are in the acceptable range. Also, CFI value is recommended to be .90 and

above (Hu & Bentler, 1999). SRMR value is required to be below .10 (Kline, 2005). In the research finding, CFI value is in the desired range with .93, while SRMR value is with .08. According to Brown (2006) and Byrne (2010), the fact that the RMSEA and SRMR values are zero or very close to zero reveals the perfection of the model. Other indices do not need to be used and reported (Brown, 2006; Kline, 2005).

When examined in the context of sub-dimensions of the scale, the opinions of the pre-service teachers regarding the Overgeneralization and Arbitrary Inference sub-dimensions are in the "I agree" range. It is seen that their views on the sub-dimensions of Labeling, Polarization, and Selective Abstraction correspond to the "indecisive" range. The range of indecision is a critical range that can tend to decrease and increase (Dağıstan, 2017). This situation points out that there may be an increase in the rational and unrealistic thoughts they form against the sciences in the sub-dimensions of Labeling, Polarization, and Selective Abstraction. Probably these are thoughts they carried unconsciously; these thoughts can push aside ideas and action and can generate stereotypical interests and reactions. As people do not tend to rush to test whether their firm thoughts are correct, they either ignore or reject information that contradicts their stereotypes (Dökmen, 1997).

In line with the findings obtained from this study, suggestions for future research and reducing stereotypes are listed. The stereotyped thinking interval of pre-service teachers and equivalent groups can be determined with "Stereotypical Thought Scale for Science Courses". Class environment and course flow can be arranged accordingly. Pre-service teachers' level of achievement can be increased by incorporating different studies in determining stereotypes of the related course to prevent stereotyped thoughts before they occur. Similar researches can be examined in line with different variables. While preparing science education programs, a system, which includes activities increasing science awareness and reducing stereotypes towards science from the moment teachers start science education, can be developed. Teachers and pre-service teachers can obtain information about stereotypes by providing short-term courses or seminars. While there are many qualified international studies on stereotypes in the literature, Turkey has limited studies related to the particular stereotypes. Hence, more studies can be done to enrich the relevant literature.

In the classroom, teachers who build a healthy communication framework for their students, so that they may observe the events from the viewpoints of the students, will not judge students' views, will take into consideration their differences, and will display a flexible attitude. All these will improve the students' communication skills in the classroom so it can, therefore, be assumed that the said teachers should have a positive effect (Özkul, 2020) not a barieer.

When teacher and student are considered as a sender and a receiver, it can be said that the teacher-student relationship should be unbiased and empathic, away from stereotypes as shown in the communication cycle, so that the sender can act as a receiver and the receiver

can act as a sender. (Edwards, 1997). One of the frequently emphasized results in the literature is that healthy communication between students and teachers directly contributes to the development of self-expression skills and self-esteem in the favor of students and indirectly affects students' academic achievement, attitudes, and behaviors toward the course (Aspy & Roebuck, 1977; Brophy & Evertson, 1976; Ceyhan, 2006). In the definition of education made by Ertürk (1984), student-student communication is as effective as teacher-student communication for "the process of achieving the desired behavior change", and it is very important to ensure that the lessons are taught in a democratic classroom environment as a basis for the healthy formation of these interactions (Ceyhan, 2006).

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University Students' Views on Distance Learning

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Abstract:

This study aims to examine distance education practices of universities in Turkey during coronavirus (covid-19) pandemic according to views of undergraduate students. The method of this study is designed in the survey model. The study group consists of 1561 students studying at 44 universities. Simple random sampling method was used while selecting the study group. The data were collected by the researchers, with the 'Scale of Distance Education Views of University Students' which was developed within the scope of the study. Study data were analyzed with descriptive tests, t-test, and ANOVA tests. The findings of this research show that there is a significant difference in the university students' positive views about distance education in terms of their social lives, socio-economic factors, ability to learn independently, making themselves willing to learn, their willingness to go to school, adaptation to the lesson plan, school performance of the students, before and after course studies, devices they use for the education, the internet connection quality they have, their capability level to use the technology, access to course resources and the system of the university they are studying at. The findings of this study provide an important insight into the factor affecting students' views on distance learning, which need to be considered in the future conceptualization of such provision.

Keywords: Distance Education, Pandemic, University Student.

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INTRODUCTION

The Coronavirus (Covid-19) pandemic, which emerged in the Wuhan Region of China towards the end of 2019 and has affected the entire world, has caused many changes in many areas of the life. Undoubtedly, one of these areas is education. With the risk of accelerating the spread of the virus, schools all over the world, starting from China started to be closed in order to prevent the virus's spread and control the virus in early 2020 (WHO,2020). In Turkey, on March 16, 2020, the Ministry of Education (MEB) announced that education suspended for three weeks at all levels (MEB, 2020). Moreover, in this three-week period, the Council of Higher Education (YÖK) also announced that they decided to suspend their activities, especially education practices for three weeks (YÖK, 2020). Following the increase in the number of cases, YÖK announced to the public its decision on March 19, 2020 that the theoretical courses of associate, undergraduate and graduate programs would continue with distance education. Distance education, which is one of the most dynamic and enriching forms of learning opportunities available when the possibility of applying face-to-face education becomes difficult, was the available alternative (Miltiadou & Yu, 2000).

Distance education is a planned systematic application of education technology in which the source and the recipient are in separate (distant) environments in most of the learning-teaching processes, and that allows its recipients for "individuality, flexibility and independence" in terms of teaching age, purpose, time, place and method; and materials, tools technologies and methods such as written and printed materials, audio tools, technologies, face-to-face education are used in learning-teaching processes, and communication and interaction between the source and the recipients are provided by interactive integrated technologies. (Uşun, 2006, s.20).

Distance education, being in a certain age range, being in a certain time period or being in a certain environment and developing technology encourage people to connect remotely (Arat & Bakan, 2011). Thousands of adults want to continue their education up to the university level, but they cannot contunie their education due to restrictions like geography, vocation, and age so the distance education is a good option. Similar developments in the world continues to develop from past to present. The development of distance education in Turkey has taken place in proportion to the socio-economic conditions of the country. Although the first known beginning instance of distance education was in the 18th century in Turkey, the first activities of distance education were started in the middle of the 20th century. The first institution that carried out distance education activities at the university level was established as the Open Education Faculty in 1982, and it carried out this activity over radio and television in the first years (İşman, 2008). Today, Eskişehir Anadolu University, Istanbul University and Erzurum Atatürk University Open Education Faculties come to the fore as the drivers of distance education. Also, 2018 PISA data indicate that Turkey has an effective online portal and that many of the teachers and school principals

have the necessary technical and pedagogical skills to integrate digital devices into education (Moreno & Gortazar, 2020).

The pandemic which has been affecting Turkey since March 2020, has made distance education the focus of education. This rapid change has increased the need for innovations and updates that will enable students to get the highest benefit they can get. Distance education is affected by factors such as the opportunity, equipment, the ability of the students to use technology, attitudes towards distance education, family and teachers who provide education. It is seen that students can develop an attitude towards the functioning of the education system as well as towards the lessons. The aim of this study is to examine (socio-economics factors, capability of using technology, scholl performance, etc.) multidimensionally, the views of university students regarding the distance education practices applied in universities in Turkey during the Coronavirus (Covid-19) pandemic. It, therefore, aims to identify the problems encountered in the process and raise awareness about the future of distance education. In line with this purpose, answers to the following questions were sought;

1. Is there a significant difference in the thoughts on distance education of university students in terms of their social lives and socio-economic factors?

2. Is there a significant difference in the thoughts on distance education of university students in terms of their ability to learn independently, making themselves willing to learn, their willingness to go to school and adaptation to the lesson plan?

3. Is there a significant difference in the thoughts on distance education of university students in terms of school performance of the students, and their studies before and after courses?

4. Is there a significant difference in the thoughts on distance education of university students in terms of the devices they use for the education, the internet connection quality they have, their capability level to use the technology, access to course resources and the system of the university they are studying at?

METHOD

This study in which the opinions of distance learning students during the coronavirus (covid-19) was developed with a quantitative approach in a research model. "Survey models are research approaches that seek to describe a past or present situation as it is. They try to define the event, person or object that is the subject of research in its own conditions and as it is "(Karasar, 2012). The questionnaire prepared for this was applied online and the opinions of university students about distance learning were determined.

Research Participant and Data Collection

The sample of the study consisted of 1561 university students studying in different cities of Turkey, who voluntarily participated in the data collection tool. When identifying

students in the study group, an online questionnaire was used to make it more accessible to the participants from different areas. Due to the difficulty of meeting students during the pandemic, the research inventory was posted on social media, where teachers could contact distance learning students suitable for the study group from various universities, and participation was voluntary. The random distribution of students in the selection group according to various demographic variables is shown in Table 1.

Table 1

Demographic data of students

									Total
Gender		Woman	Man						
	n	1238	323						1561
	%	79,3	20,7						100
University type		State University	Foundation University						
	n	36	8						44
	%	82	18						100
Branch		Social Science	Health Sciences	Chemistry-Physics-Biology Sciences	Fine Arts				
	n	31	6	15	7				59
	%	53	10	25	12				100
Hometown		Cite	County	Town	Willage				
	n	871	559	56	75				1561
	%	55,7	35,8	3,5	4,8				100
Region		Mediterrenian	Eastern Anatolia	Aegean	Southeastern Anatolia	İnner Anatolia	Black Sea	Marmara	
	n	7	4	5	5	7	4	5	37
	%	18,9	10,8	13,5	13,5	18,9	10,8	13,5	100

The data of the study were collected through "Scale of Distance Education Views of University Students" developed by the researchers. During the development process of the questionnaire, firstly, the relevant sources were examined. Afterward, the three lecturers from Special Education Department of Necmettin Erbakan University were consulted for the expert opinion on the content and scope validity of the questionnaire. The questionnaire, which was rearranged in line with expert views, was finalized after it was administered to 427 students. The questionnaire with a total of 25 questions was consisted of two parts which are, the first part with 5 closed-ended questions that aims to determine the demographic characteristics of the students and the second part with 20 closed and open-ended questions that aims to understand the views of university students on the distance education. Before the questionnaire was applied, a short explanation about the purpose of the research was given to the participants. Within this context, while conveying the research conditions to the participants, it was stated that the findings data would not be shared with third parties in any way, they could be informed about the results of the research if they choose, the participation is voluntary, and they could quit participation at any time they want. The questionnaire has lasted approximately between (8) and (13) minutes individually, for each participant.

Data Analysis

Due to the normal distribution of the data and descriptive statistics (percentage, frequency, arithmetic mean and standard deviation), t-test and one-way analysis of variance / ANOVA were applied in the analysis of quantitative data. The aim of descriptive statistical methods is to understand the data, identify patterns and relationships, and use the results better (Gök at al., 2015). In this study, we have tried the presentation of the data of students concerning distance education to make descriptively.

The effect size of the descriptive data obtained in the study was one of the questions, so the Cohen d value, which gives the effect size value, was calculated in the interpretation of the findings. The difference between the averages of two events or groups is called the effect size. Accordingly, the effect sizes are interpreted by considering the criteria of "d ≥ 1 very large effect, 0.8 large effect, 0.5 medium effect, 0.2 small effect".

Ethical considerations

In this study, all rules stated to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics", which is the second part of the directive, were not taken.

This study was approved by the Necmettin Erbakan University.

Ethical review board name: Necmettin Erbakan Ethics Committee

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RESULTS

In this section, statistical results of the analysis are presented for different variables regarding their effects on the views of students on distance education.

With the research, it is revealed that whether there is a difference in the views of students on distance education compared to their social life in normal education. The data obtained are shown in Table 2.

Table 2

Comparison of students' views about distance education according to their social life in normal education.

		N	X	SS	F	p	Significance
1	Intense	521	125,06	30,717			Between 2-1, 3-1 and 2
2	Average	899	134,65	27,583	26,180	,000	
3	Low	141	141,23	28,847			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference (f: 26.180; p <0.05) in terms of distance education scores according to activity of the students' social life. The views

on the distance education of students who stated that their social life was moderately active in the normal education process before the Covid-19 pandemic are more positive than the students who stated that their social life was very active. The views on distance education of students who stated that their social lives were not active in the normal education process were more positive than the students who stated that their social lives were very active and moderately active.

The research showed how the views of students on distance education differ according to their socio-economic conditions. The data obtained are shown in Table 3.

Table 3

Comparison of students' views about distance education according to their socio-economic conditions

		N	X	SS	F	p	Significance
1	High	60	126,35	35,720			
2	Moderate	1309	134,25	28,548	25,513	,000	Between 2 and 3
3	Low	192	118,74	28,036			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference (f: 25.513; p <0.05) in terms of the distance education scores of the students according to their economic conditions. The students with moderate economic conditions have more positive views of distance education than the students with low economic conditions.

The research was also examined whether there is a difference in students' views on distance education according to their ability to learn independently. The data obtained are shown in Table 4.

Tablo 4

Comparison of students' views about distance education according to their independent learning skills

| | Independent Learning | Group Statistics | | | | | | |
		N	X	SS	t	df	p.	Cohen d
Views about D.E.	Yes	963	31,57	7,15	12,145	1559	,000	0.63
	No	598	27,10	6,93				
Their Own Situation Regarding the D.E.	Yes	963	33,52	7,38	11,866	1559	,000	0.61
	No	598	28,90	7,63				
Continuation of education during D.E.	Yes	963	39,46	8,16	7,845	1559	,000	0.40
	No	598	36,01	8,89				
Attitude towards D.E.	Yes	963	23,62	6,55	11,695	1559	,000	0.61
	No	598	19,69	6,28				
Homework During D.E.	Yes	963	11,04	4,16	10,564	1559	,000	0.55
	No	598	8,81	3,85				
Total	Yes	963	139,21	27,73	12,920	1559	,000	0.67
	No	598	120,51	27,90				

The data regarding students' views about distance education were analyzed with the t-test according to the students' ability to learn independently on their own, and the results obtained are shown in Table 4. When the data were analyzed, according to students' willingness to learn, there was a significant difference in terms of students' scores on the continuation of distance education, their thoughts on distance education, their attitudes

towards distance education, homework in the process of distance education, their own situation regarding distance education and their general views on distance education (p <0.05). It has been determined that distance education perceptions of the students who stated that they could learn by themselves were more positive than those who stated that they could not learn by themselves. The Cohen d value calculated with the data obtained for the variables with a significant difference among them is between 0.40 and 0.67, and according to this result, the difference has a moderate size.

The study also examined whether there is a difference in the views of the students regarding distance education according to their ability to make themselves willing to learn. The data obtained are shown in Table 5.

Table 5

Comparison of students' views on the distance education according to their willingness to learn by themselves.

	Enthusiasm for learning	N	X	SS	t	df	p	Cohen d
			Group Statistics					
Views about D.E.	Yes	1122	31,54	6,97	15,410	1559	,000	0.87
	No	439	25,56	6,67				
Their Own Situation Regarding the D.E.	Yes	1122	33,69	7,15	17,059	1559	,000	0.95
	No	439	26,80	7,21				
Continuation of education during D.E.	Yes	1122	39,54	8,12	10,616	1559	,000	0.58
	No	439	34,56	8,81				
Attitude towards D.E.	Yes	1122	23,30	6,55	11,593	1559	,000	0.66
	No	439	19,08	6,21				
HomeworksDuring D.E.	Yes	1122	11,02	4,08	13,261	1559	,000	0.76
	No	439	8,05	3,66				
Total	Yes	1122	139,08	27,09	16,460	1559	,000	0.92
	No	439	114,06	26,74				

When the data were analyzed, according to students' willingness to learn, there was a significant difference in terms of students' scores on the continuation of distance education, their thoughts on distance education, their attitudes towards distance education, homework in the process of distance education, their own situation regarding distance education and their general views on distance education (p <0.05). According to this analysis, distance education perceptions of students who can make themselves willing to learn are more positive than others. The Cohen d value calculated with the data obtained for the variables with a significant difference among them is between 0.58 and 0.76, and according to this result the difference has a moderate size. It can be said that Cohen's d value is between 0.87-0.95, and accordingly the difference has a large degree of effect size.

The research revealed whether there is a difference in students' views on distance education according to their willingness to go to school. The data obtained are shown in Table 6.

Table 6

Comparison of students' views about distance education according to their willingness to go to school

		N	X	SS	F	p	Significance
1	High	858	122,77	27,933			Between 2 and 1, 3 and 1-2
2	Average	574	141,09	25,224	121,408	,000	
3	Low	129	153,45	30,701			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference in terms of the distance education scores of the students according to the students' willingness to go to school (f: 121.408; p <0.05). It is seen that students with moderate willingness to go to school have more positive views of distance education than students with a high level of willingness to go to school; It is observed that students with a low level of willingness to go to school have more positive views of distance education than students with a high level of willingness to go to school and students with a moderate level of willingness to go to school.

Whether the views of the students on distance education differ according to their adaptation to the lesson plan was also examined in this study. The data obtained about how students' views about distance education differ accordingly are shown in Table 7.

Table 7

Comparison of students' views about distance education according to their adaptation to the lesson plan

	Following the plan	N	X	SS	t	df	p	Cohen d
Views about D.E.	Yes	958	31,56	7,32	12,014	1559	,000	0.63
	No	603	27,14	6,65				
Their Own Situation Regarding the D.E.	Yes	958	33,81	7,43	13,944	1559	,000	0.72
	No	603	28,47	7,25				
Continuation of education during D.E.	Yes	958	39,50	8,37	8,048	1559	,000	0.41
	No	603	35,97	8,54				
Attitude towards D.E.	Yes	958	23,26	6,84	8,676	1559	,000	0.45
	No	603	20,29	6,11				
Homeworks During D.E.	Yes	958	11,01	4,21	10,108	1559	,000	0.53
	No	603	8,88	3,80				
Total	Yes	958	139,15	28,82	12,704	1559	,000	0.66
	No	603	120,76	26,21				

The data about the students' views on distance education were analyzed with the t-test according to the students' adaptation to the lesson plan, and the results obtained are shown in Table 7. When the data were analyzed, there was a significant difference in terms of the students' scores regarding the continuation of distance education, their thoughts about distance education, their attitudes towards distance education, homework in the process of distance education, their own situation regarding distance education and their general views on distance education according to the students' adaptation to the plan (p <0, 05). These analyses show that distance education perceptions of the students who adapt to the lesson plan are more positive than those who do not. The Cohen d value calculated with the data obtained for the variables with a significant difference among them is 0.41 for education during D.E. and 0.45 for attitude towards D.E., according to these values, the

difference has a small effect. However, for other variables, the Cohen's d value is between 0.53-0.72, and the difference has a moderate effect size. According to the research findings, it was revealed that the students' adaptation to the lesson plan caused a differentiation in the distance education perceptions of the students. It has been determined that the distance education perceptions of the students who stated that they adopt the lesson plans properly were more positive than the students who did not.

With the research, it is revealed that whether there is a difference in students' views on distance education according to their school performance. The data obtained are shown in Table 8.

Table 8

Comparison of students' views about distance education regarding their performance in classes

		N	X	SS	F	p	Significance
1	High	517	127,88	30,730			
2	Average	1014	134,23	28,285	8,222	,000	Between 2 and 1
3	Low	30	129,83	27,587			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference (f: 8.222; p <0.05) in terms of distance education scores according to students' school performance. It is seen that students with average school performance have more positive views on distance education than students with high school performance.

Whether there is a difference in the views of the students on distance education according to their studies before the lessons are examined. The data obtained are shown in Table 9.

Table 9

Comparison of students' views about distance education according to their studies before courses

		N	X	SS	F	p	Significance
1	No studying	404	132,24	28,089			
2	0-1 hour	534	124,38	29,434	61,507	,000	Between 1 and 3-4,
3	1-2 hours	577	138,73	27,492			2 and 3-4, 3 and 4
4	2-3 hours	46	135,43	36,810			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference in terms of distance education scores (f: 61.507; p <0.05) according to the students' studies before the lessons. it is proven that students who do not study have more positive views of distance education than students who study 0-1 hours have more positive views on distance education than students who study 1-2 hours and students who study 2-3 hours, and students who study 1-2 hours have a more positive view of distance education than students who study for 2-3 hours.

It is revealed that whether there is a difference in the views of the students on distance education according to their studies after the lessons. The data obtained are shown in Table 10.

Table 10

Comparison of students' views about distance education according to their studies after courses

		N	X	SS	F	p	Significance
1	No studying	260	147,03	28,082			
2	0-1 hour	386	141,09	25,806	101,304	,000	Between 1 and 2, 3 and 4, 2 and 3 and 4, 3 ile 4
3	1-2 hours	543	131,10	26,440			
4	2-3 hours	372	113,54	27,294			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference (f: 101.304; p <0.05) in terms of the distance education scores of the students according to their studies after the lessons. It is seen that students who do not study have more positive views of distance education than students who study 0-1 hours, students who study 1-2 hours and students who study 2-3 hours; students who study 0-1 hours have more positive views on distance education than students who study 1-2 hours and students who study 2-3 hours, and students who study 1-2 hours have a more positive view of distance education than students who study for 2-3 hours.

With the research, it is revealed whether there is a difference in the views of students on distance education according to the devices they follow. The data obtained are shown in Table 11.

Table 11

Comparison of students' views about distance education according to which technological device they use for distance education

		N	X	SS	F	p	Significance
1	Computer	404	132,24	28,089			
2	Phone	534	124,38	29,434	23,457	,000	Between 1-2, 3-1 and 2
3	Multiple Devices	577	138,73	27,492			
4	Tablet	46	135,43	36,810			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference in terms of the distance education scores of the students according to the devices that students follow distance education (f: 23.457; p <0.05). It is seen that the students who follow the distance education on a computer have more positive views of distance education than the students who follow distance education on a phone, students who follow distance education on over one device have more positive views of distance education than students who follow distance education from computers and phones.

Whether there is a difference in the views of the students concerning distance education according to the quality of the internet they use is analyzed. The data obtained are shown in Table 12.

Table 12

Comparison of students' views about distance education according to their internet connection quality

		N	X	SS	F	p	Significance
1	High Quality	611	143,71	28,180			Between1 and 2-3, 2 and 3
2	Partly Good	554	129,59	26,518	114,244	,000	
3	Have Problems	396	117,47	27,090			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference (f: 144,244; p <0.05) in terms of the distance education scores of the students according to the quality of the internet they use. It is seen that students with good internet quality have more positive views on distance education than students with partly good internet quality and students who have problems with internet quality, and students with partly good internet quality have more positive views on distance education than students who have problems with internet quality.

Whether there is a difference in students' views on distance education according to their level of technology usage is examined. The data obtained are shown in Table 13.

Table 13

Comparison of students' views about distance education according to level of technology usage

		N	X	SS	F	p	Significance
1	Sufficient	933	137,97	29,165	64,258	,000	Between 1 and 2-3, 2 and 3
2	Partly sufficient	521	125,80	26,340			
3	Insufficient	107	110,74	27,230			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference in terms of distance education scores (f: 64,258; p <0.05) according to students' level of technology usage. The findings showed that students with a sufficient level of technology usage have a more positive view of distance education than students with a partly sufficient level of technology usage and students with an insufficient level of technology usage, and students whose technology usage level is partly sufficient have more positive views on distance education than students with insufficient technology usage levels.

Whether there is a difference in the views of the students concerning distance education according to the opportunity to access course resources is examined. The data obtained are shown in Table 14.

Table 14

Comparison of students' views about distance education according to their opportunity to access course resources

		N	X	SS	F	p	Significance
1	Sufficient	711	142,53	27,648			Between 1 and 2, 1-3 and 2-3
2	Partly sufficient	687	126,73	26,246	126,591	,000	
3	Insufficient	163	108,70	28,544			
	Total	1561	132,04	29,240			

When the data are analyzed, there is a significant difference (f: 126,591; p <0,05) in terms of the distance education scores of the students according to the students' opportunity to access resources. As it is seen in the findings students who have sufficient access to course resources have more positive views of distance education compared to students who have partly sufficient access to course resources and students whose opportunity does not access course resources. Also, students who have partly sufficient access to course resources have more positive views of distance education than students who have insufficient access to course resources.

The study also examined whether there is a difference in the views of students on distance education according to the distance education system of the universities. The data obtained are shown in Table 15.

Table 15

Comparison of students' views about distance education according to university's distance education system

	Distance Education System	N	X	SS	t	df	p	Cohen d
			Group Statistics					
Views about D.E.	Yes	832	33,53	6,21	24,750	1559	,000	1.25
	No	729	25,66	6,32				
Their Own Situation Regarding the D.E.	Yes	832	35,53	6,42	23,879	1559	,000	1.20
	No	729	27,43	6,97				
Continuation of education during D.E.	Yes	832	42,29	6,87	23,719	1559	,000	1.19
	No	729	33,40	7,93				
Attitude towards D.E.	Yes	832	24,66	6,32	17,457	1559	,000	0.88
	No	729	19,21	5,96				
Homeworks During D.E.	Yes	832	11,87	3,88	18,828	1559	,000	0.95
	No	729	8,26	3,66				
Total	Yes	832	147,88	23,83	28,034	1559	,000	1.42
	No	729	113,96	23,86				

The data about the students' views on distance education according to the distance education system of the university were analyzed by t-test and the results obtained are shown in Table 15. When the data are analyzed, there is a significant difference in terms of the students' scores on the continuation of distance education, their thoughts about distance education, their attitudes towards distance education, homework in the process of distance education, their own situation regarding distance education and their general views on distance education according to the distance education system of the university (p <0.05). It can be said that the Cohen d value calculated for the variables with a significant difference among them on the data obtained is between 0.88 and 1.42, and the difference has a large effect size.

DISCUSSION

The large majority of students dis-affirmed the idea that distance education is more effective than face-to-face education. This proves that students prefer face-to-face education. In the last decade, distance education applications have become widespread in our country (Gürer, Tekinarslan & Yavuzalp, 2016). With the COVID-19, distance education process has

become more widespread than ever. As a result of this study, it has been revealed that face-to-face education is preferred more than distance education according to university students, and lecturers, also the students need training related to distance education. Keskin and Özer (2020) also stated in their study that the majority of participating students do not find the distance education as effective as face-to-face education. It also findings shows that students have a negative attitude towards distance education.

The study also showed that students who are more successful in their school have a more positive attitude than students who are not as successful. It is thought that the success of students at school reflects on distance education positively, and successful students take part in distance education more willingly. The research showed that students who describe their social lives as an average among the choices of intense/average/low exhibit more positive attitudes than students who think that their social lives are very active and their social lives are very low. A distance education technical and psychological support unit students can reach at any time should be established that students can reach at any time so that students can organize their social life and educational activities more efficiently. Activities in which the school blends in with society should be organized with a unit. The students who remain passive in social life should be integrated into social life, and the students who are very active in social life should be guided in organizing their lives.

The research showed that the students who follow the distance education on a computer have a more positive view of distance education than the students who follow the distance education on a phone, and students who follow distance education on over one device have a more positive view of distance education than students who follow distance education from computers and phones. It should be emphasized that this situation may be related to the factors like technology, quality of internet connection, and socio-economic status. The results of the study are similar to the study by Barış (2015). Students mostly prefer to connect via mobile devices. It is recommended that universities provide device support for distance education to students who need it (e.g. poor). In addition, some problems that the students experience affect distance education negatively. For example, computer malfunctions and sharing a computer with their family members (Sakarya & Zahal, 2020) or system access problems (Altun Ekiz, 2020) may affect students negatively. Even though distance education makes many things easier in life, it also brings an economical burden. Distance education barriers are also directly related to economic status of a family (Atasoy, Özden & Kara, 2020). Karatepe, Küçükgençay and Peker (2020) stated in their study that the majority of students attend classes over landline from mobile phones and computers. The study identified that the problems experienced during the connection are related to the connection, not the device. At the end of the study, it has been revealed that the attitude towards distance education is directly proportionate to the quality of internet connection. To address this problem, technical support units for distance education should be established at universities. These units should provide technical support to all

stakeholders at all times and the problems that arise should be corrected as soon as possible (Durak, 2017).

As the results indicated, students who stated that they can learn independently on their own have more positive attitudes towards distance education than students who have weaker self-learning skills. One of the basic advantages of distance education is to be able to adjust your own learning speed and progress individually. Keskin and Özer (2020) indicated that almost half of the students can adjust their learning pace individually in their study with undergraduate and graduate students. Thus, the ability to organize their self-learning is important. The result of the study also supports Keskin and Özer's findings.

The results showed that students who stated that they were more willing to learn also have a more positive attitude towards distance education. It is thought that the desire to learn also causes a positive effect on distance education. Many subjects, such as the materials used in distance education, the content of the course, communication styles, and how to transfer information to the students should be planned carefully (Tuncer & Taşpınar, 2008). It should be done with active participation and be well-planned in order for distance education to become the most efficient (Türkoğlu, 2003). Students who abide by distance education plans have more positive attitudes than students who do not abide by distance education plans. It is thought that the planning made according to this situation is beneficial and not following the planning has a negative effect on the students benefiting from distance education, and this reflects on their perception of distance education. Therefore, students' forming positive perceptions about themselves and improving their affective characteristics may reflect their views on distance education positively.

It is seen from the comparison of students' views about distance education according to their willingness to go to school that students with a high desire to go to school have a more positive attitude than other students. Students' ideas should be taken for the planning process of social areas within universities in order to increase students' liking for school, and the quality of the school should be increased by determining the expectations of the students from the school.

It is beneficial for students to develop their own learning skills in order to carry out distance education more effectively and to be able to form more positive views. It has been determined that the perceptions on the distance education of the students who review the lessons after the classes in the distance education process are more positive than the students who do not. It is known that the success points of the group that has repeated and corrected lessons are higher (Alacapinar, 2006).

It has been found that students with better internet usage skills have a more positive attitude than students with lower internet usage skills. In the information age we live in, people need to know the innovations in accessing information in order to benefit from the information sufficiently, and this can only happen with technology (Naralan, 2008). Gömleksiz and Pullu (2020) stated in their study that some students cannot follow the

educational practices in distance education properly because of financial incapabilities such as not having their own computers.

It has been revealed that university students who find the distance education application of the university is sufficient have more positive attitudes than the students who do not find the distance education system of the university is sufficient. According to this result, it is suggested that think that universities should develop distance education systems by taking the opinions of students. Durak, Çankaya and İzmirli (2020), stated that the majority of the participants expressed their satisfaction with the learning management system and course software system used by the university. Besides, they stated that they did not know if the instructors were ready for longer-term of distance education. Therefore, universities should also complete their institutional structuring. Distance education applications, which are implemented before the institutional structuring is completed, will keep students away from educational processes rather than benefiting (İşman, 2011). For this reason, it is beneficial for all our universities to have the infrastructure and equipment that provide effective distance education. Necessary basic equipment should be provided in order for students to benefit from distance education activities to the maximum potential. Today, in order to participate in all distance education services, including online lessons, a high-speed internet connection, a receiver such as a computer, tablet or phone and a quiet home environment are required.

RECOMONDATIONS

It is thought that the results of this study may guide new studies to be done. Development and change in distance education continue day by day, this study needs to be supported by additional research. Furthermore, it is believed that it would be useful to conduct research on psychosocial factors that strongly influence student motivation and participation. Along with that, it is recommended to conduct research with other parties in the education field.

CONCLUSION

In this study, the opinions of university students regarding distance education, which has become the basic education method in Turkey and around the world due to the coronavirus COVID-19 pandemic, were analyzed. In this study, the thoughts of university students about the continuation of distance education, their perceptions of themselves in distance education, their thoughts about education practices in distance education, their thoughts about homework in distance education and students' attitudes were examined. As a result of the research, it was seen that demographic and socio-economic factors affect the perception of distance education.

With the research, it was concluded that women developed more positive attitudes towards distance education than men. According to the findings of the research, although they state that they have a negative attitude towards the lessons, many students feel more

comfortable with distance education compared to the classroom environment. It was concluded that students who stated that they were willing to learn more and more successful at school developed more positive attitudes towards distance education.

In the results of the research, most of the students stated they could take notes during distance education even though they are shy about asking questions of teachers. It may be beneficial for teachers to change their attitudes and create an environment where students can easily ask questions.

From the findings of this research, it was concluded that the students could not put forward a clear view regarding the distance education course durations. It has been determined that infrastructure indicators consisting of components such as internet connection and access devices are effective on students' perceptions of distance education. In order to improve the perception of students, it is proven that providing necessary infrastructure services and necessary support to students who have problems in personal access is important. According to the research, the fact that their university has advanced distance education systems caused students to develop positive attitudes towards distance education. Since the financial adequacy of students positively affects their perceptions of the distance education process, scholarship and student loan opportunities should be increased and students should be prevented from experiencing financial difficulties during the school period. As a result of it was concluded that the students found face-to-face education more beneficial. To make the student's experience with distance education more efficient, it should be ensured that teachers participate in training that can improve themselves in the field of distance education.

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The Effects of Integrated Mathematics and Life Sciences Teaching on Primary School Students' Value Acquisition

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Abstract:

A subject worth examining was the interdisciplinary approach's planning and application of two distinct disciplines and investigating the value acquisition inclinations of students who participated in the multidisciplinary approach. In this context, the problem sentence of the research is that: Does integrate mathematics and life sciences teaching have an effect on primary school 3rd-grade students' acquisition of honesty, respect, love, and helpfulness values?". The impact of integrated Mathematics and Life Sciences teachings in third grade on students' honesty, respect, love, and helpfulness value dispositions was studied using a quasi-experimental method with a pretest-posttest control group and the theme of "tolerance." As the data collection tools of the research, the "Honesty Value achievement Scale," "Love achievement Scale," "Respect achievement Scale," and "Helpfulness achievement Scale" was applied to the students in the sample. This research was conducted in three stages: preliminary preparations before application, integration of disciplines, lesson plan preparation, and actual application. There was a significant difference in favor of the experimental group when comparing students taught integrated mathematics and life sciences versus retrained students using a Ministry of National Education-approved course and workbook. In addition, there was a significant difference in favor of the post-test between the pretest-posttest scores of the honesty, respect, love, and helpfulness values belonging to the students in the experimental group taught integrated mathematics and life sciences.

Keywords: Mathematics teaching, life science, integrated teaching, value acquisition.

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INTRODUCTION

The primary reason for civilizations' actions toward educational movements throughout history is the need to fulfill a demand for information in the geography they live in for survival. One may argue that the desire to know exists to improve societies' welfare levels and to live in better conditions. Its goal is to provide people with the fundamental knowledge, skills, and values they need to integrate into the geography and society in which they live. In this regard, societal requirements should determine the overarching goal of education. In *Some Thoughts Concerning Education"*, Locke (1779) defines education as the most crucial phenomenon that marks the difference between societies. Indeed, when we examine the gradual changes in nations' social, cultural, and economic spheres from the past to the present, one of the primary catalysts for these changes in education. As a result, the quality-enhancing characteristics of curricula developed to raise the educational quality should be demonstrated structured.

When it comes to the twenty-first century, named the information age, society's expectations of the educational system have shifted. It is clear that, rather than learning more in alignment with the century's goals, the urge to acquire more practical skills takes precedence. With this reasoning, it is clear that how that is owned and used appropriately at the appropriate moments is as critical as the information that individuals possess today. In addition to these, it is necessary to be a civilized society to gain the civilized national values that every individual living in the community must have (Demirci Güler & Açıkgöz, 2019). Ekşi (2003) described values must haven as the process of successfully teaching students academically and instilling fundamental values.

Schools have taken on the mission of providing students with the information, skills, and attitudes essential to live in peace with their society and the rest of the world because of their practitioner nature (Sözer & Yılmaz, 2019; Fidan & Erden, 2001). In this view, the planned and successful presentation of values education in primary school, the earliest stage of students' education, is critical for the healthy development of students' character and value achievements across their lives (Tahiroğlu & Tay, 2020). However, the ordinary deduction revealed by the study standard (2006), Lee and Zhou (2015), and Wei and Eisenhart (2011) are that students' academic performance in international comparison exams such as TIMSS and PISA, as well as in school, is contingent upon a firm grasp of value-based education.

Researchers discovered many distinct perspectives on values education (Nalçac 2016; Uzunkol & Yel 2016). When various techniques are studied, it becomes clear that some seek to instill the student's value directly. In contrast, others characterize a system representing or rejecting the matter described in the student's question weight (Aladağ, 2009). While some of these techniques are a part of the schools' open and hidden curricula, others offer planned classroom activities within the curriculum (Doğanay, 2006). Five approaches have been put forward about "About values education" by Superka (1973) as follows: *in the*

calculation, moral development, value clarification, behavior learning approach, and behavioral approach" (Cited by Superka, Ahrens and Hedstrom, 1976).

Oliver and Newmann (1967-1972), Shaver and Larkins (1973), and Metcaft (1971) created the value analysis approach utilized in this study to well-organized education. Organizing to the approach's understanding, students draw logical conclusions about values and apply their scientific process skills. Additionally, teachers assist students in conceptualizing values and conceptualizing through reason and logic.

For the ideal individuals that a civilized society wants to raise, there should be an education system that aims to develop knowledgeable and skilled individuals and have social and universal values per the needs of the age. This required educational system must answer the complex and interdisciplinary challenges resulting from the developments mentioned above. In this sense, during the mid-twentieth century, as the science of epistemology advanced and the boundaries established by the complexity of knowledge investigated, scientists and philosophers began to consider the possibility of constructing various integrations within their respective disciplines.

According to a literature review, integration studies for the interdisciplinary approach are on many curriculum elements. These integration studies are performed through science (Güven, 2012; White & Carpenter, 2008; Öztürk, 2019; Tekerek & Cebesoy, 2017; Yalçın, 2020; Cervetti, Barber, Dorph Pearson & Goldschmidt, 2012), social studies (Keçe & Merey 2011; Aladağ, 2009; Bolat, 2016; Güneş;2007; Çelik, 2017; Aslan, 2017; Aladağ and Şahinkaya, 2013; Morris, 2008; Simon, 2015), Turkish (Şahbaz and Çekici, 2012; Hartzler, 2000; Demir, 2009), games and physical activities (Boyraz, 2015), visual arts (Pehlivan, 2015; Trent & Riley, 2009), life sciences (Demirel, Tuncel, Demirhan & Demir, 2008), mathematics lessons (Özçelik & Semerci, 2016; Macit, 2020; Alp, 2010; Çelebi, 2020; Tertemiz & Çakmak, 2000; İpekçi, 2018; Turhan Türkkan, 2017) and values education (Katılmış, Ekşi & Öztürk, 2010; Çelik, 2017; Aslan, 2017). In addition, some studies have been conducted directly on teacher-student views (Whisenhunt, 2009; Obradovich, 2009; Guercio, 2003; Doğanay, Karakuş, & Bolat, 2013), and some of the studies are related to the application dimension of the interdisciplinary approach (Işık Tertemiz & Aslantaş, 2018; Ayvaz Tuncel, 2009; Taylor, 2011; Morris, 2008; Campbell and Henning 2010; McKenna, 2007; Karakuş and Aslan, 2016; Chan Man 2005; Aybek & Duman, 2003; Yıldırım, 1996). Experiments have demonstrated that integrating the curriculum with an interdisciplinary approach also contributes significantly to the education dimension. When the research stated above that used a multidisciplinary approach are examined, it becomes evident that science, Turkish, English, visual arts, and social sciences were the most commonly used disciplines (Tekerek & Cebesoy, 2017; Şahbaz & Çekici, 2012; Pehlivan, 2015; Keçe & Merey 2011). A review of the research mathematics discovered that there is no integration research with another subject, which is generally associated with a skill, attitude, or value (Macit, 2020; Çelebi, 2020). In addition, there was only one study regarding life sciences lessons.

As a result, it turns out that the limited number of studies on life sciences and mathematics courses are only single-disciplinary integration studies. However, while looking at research on other classes, it has been established that different studies are building interdisciplinary connections (Hartzler, 2000; Demir, 2009; Karakuş & Bolat, 2013; Tekerek & Cebesoy, 2017; Şahbaz & Çekici, 2012). As a consequence of these studies, the interdisciplinary approach positively adds to the students' value achievement. Various integration models recognize multidisciplinary activities in the teaching processes. A model for primary schools is identified by integrating the life science lesson, which is essential for individuals to sustain their lives. The mathematics lesson, which is critical to the continuation of life, begins with the history of humanity. The parallels and contrasts in the dimensions of skills and values that these two disciplines seek to impart to the individual indicate that integration has the qualities found in the literature. A mathematics lesson connects abstract symbols and the physical world (Tertemiz, 2017). The life science lesson is defined as based on collective education and give. It gives the characteristics of being a national citizen and an international citizen in an increasingly globalizing world (Tay, 2017). Based on these definitions, an examination of the curriculum of mathematics and life sciences lessons revealed that these two lessons have many common points under the principles of approach regarding the achievements, skills, and values they aim to bring to the student.

Furthermore, the common root values provided in both lessons will serve to emphasize the significant emphasis. The program's root values include the function of education systems is to bring justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, and benevolence to individuals. Root values should be given through teaching programs to fulfill this function. In this context, values were not a distinct learning area or unit in achieving the root values in the curriculum but rather as the ultimate objective of the educational process. Additionally, values education should establish a relationship with the subject, unit, and achievements (MEB, 2018). Interdisciplinary thematic studies provide students with skills that are difficult to acquire through traditional methods.

Additionally, because value judgments have begun to change in the modern-day, its significance to values education, which has gained prominence in recent years, has been proven via studies (Öztürk, 2009). When the 2017 and 2018 primary school curricula are compared, it is clear that values education is given a high priority under the title of root values (MEB, 2017; MEB, 2018). Indeed, under the title of values, included in all 2018 primary school curricula, we can state that the following definition supports the deduction: *"our values, which define our fundamental human characteristics, are the source of our power and the power that enables us to act in the routine flow of our lives and in resolving the problems we encounter"* (MEB, 2018). In this context, it is critical to employ an interdisciplinary approach, as advocated by studies (Katılmış, Ekşi & Öztürk, 2010; Çelik, 2017; Aslan, 2017) that have demonstrated a good impact on values education, particularly in mathematics and life sciences classes.

Examinations of applied mathematics and life sciences programs discovered inadequacies in analyzing the programs' accomplishments while using an interdisciplinary understanding of the subject (Pehlivan, 2015; Taylor, 2011). A subject worth examining was the multidisciplinary planning and application of two distinct disciplines around a theme and investigating the value acquisition inclinations of students who participated in the interdisciplinary context; the research problem is that: *Does Do the mathematics and life sciences teaching affect affected-grade students' acquisition of honesty, respect, love, and helpfulness values?*".

METHOD

Research Model

In the research, a quasi-experimental design with a pretest-posttest control group, designed under the theme of "tolerance," determined the effect of teaching integrated Mathematics and Life Sciences lessons in the third grade of primary school on students' honesty, respect, love, and helpfulness value tendencies. Experimental research is a type of study where the researcher examines data to uncover the cause-and-effect relationship by establishing the necessary conditions (Christensen, Johnson & Turner, 2015). As implied by this definition, the control aspect is a critical component of experimental studies, and empirical research differs from non-experimental quantitative research in this regard (Howitt & Cramer, 2004: 132). In this research, quasi-experimental design, one of the experimental designs, was used. Quasi-experimental methods are the natural practical ways of scientific value (Manion, Cohen & Morrison 1997: 298). The quasi-experimental design employ scenarios where the controls required by natural experimental techniques are unavailable or even insufficient (Creswell, 2003: 167; Howitt & Cramer, 2004: 133). Due to the impossibility of randomly assigning students to the groups for the experimental design in this study.

The Population and the Study Group of the Research

This study utilized the study population and the group study. The multi-stage sampling method identified students in the 3rd grade of primary schools in Kırşehir city center. The first step employed a purposive sampling method. In cooperation with the provincial directorate of national education, primary schools in the city center were listed as low, medium, and high, considering the socio-economic level and success dimensions. School applications were chosen randomly from middle-level schools to ensure population representation and avert excessive impacts. The second step determined the study groups. A simple random sampling method decided the study's experimental and control groups at this stage. This stage established collaboration with school administration, and value scales were used as a pretest to eight classes with 3rd graders. Pretest findings selected two types

randomly in five categories. Following that, one class was designated as the "experimental group," while the other was the "control group."

Regarding the gender distribution of the students forming the experimental group, female students constituted 59.4% of the group, while male students constituted 40.6%. In terms of gender, female students constituted 52.9%, and male students constituted 47.1% of the control group. In terms of the gender distribution of the experimental and control groups, students female students account for 62.1 % of the enrollment, while male students account for 37.9 %.

Determination of Equivalence of Study Groups

To determine the equivalence of the groups before the experimental procedure, the "Honesty Value Acquisition Scale," "Respect Value Acquisition Scale," "Love Value Acquisition Scale," and "Helpfulness Achievement Scale" were applied as pretests. The pretest results were examined to determine which test to use to evaluate group equivalence to see if they showed a normal distribution. Examination of the values ascertained that the pretest data for the experimental and control groups were statistically within the normal distribution limits. Based on this finding, the "independent sample t-test," a type of parametric test, was employed to determine the experimental and control groups' equivalence before the experiment—table 1, Table 2, Table 3, and Table 4 display the independent sample t-test.

Table 1. *Pre-Test Descriptive Statistics Scores of Experimental and Control Group Students' on the* Honesty Value Acquisition *Scale*

	N	X̄	sd	se	sd	t	p
Experimental	32	1.50	.31	.05	64	-1.02	.310
Control	34	1.59	.39	.07			

p>.05

Table 2. *Pre-Test Descriptive Statistics Scores of Experimental and Control Group Students' on the* Love Value Acquisition *Scale*

	N	X̄	sd	se	sd	t	p
Experimental	32	1.67	.32	.06	64	-.634	.528
Control	34	1.73	.43	.07			

p>.05

Table 3. Pretest Descriptive Statistics Scores of Experimental and Control Group Students' on the Respect Value Acquisition Scale

	N	X̄	sd	Se	sd	t	p
Experimental	32	1.67	.32	.06	64	-.179	.859
Control	34	1.69	.20	.04			

p>.05

Table 4 *Pre-Test Descriptive Statistics Scores of Experimental and Control Group Students' on the* Helpfulness *Value Acquisition Scale*

	N	X̄	sd	Se	sd	t	p
Experimental	32	1.62	.37	.06	64	-.920	.361
Control	34	1.72	.50	.08			

p>.05

Examination of Table 1, Table 2, Table 3, and Table 4 shows that the independent sample t-test used to determine the equivalence of the research groups' honesty value acquisition scores, love achievement scores, respect achievement scores, and helpfulness achievement scores showed that there is no significant difference between the research groups' honesty value acquisition scale pretest mean scores (t_{64}=-1.02; p>.05), love value acquisition scale pretest mean scores (t_{64}=-.634; p>.05), respect value acquisition scale pretest mean scores (t_{64}=-.179; p>.05) and the helpfulness value acquisition scale pretest mean scores (t_{64}=-.920; p>.05). According to this finding, the study groups were comparable in terms of honesty, love, respect, and helpfulness value acquisition scores; in other words, the research groups were equivalent before the experimental process.

Data Collection Tools and Process

As the data collection tools of the research, the "Honesty Value achievement Scale," "Love achievement Scale," "Respect achievement Scale," and "Helpfulness achievement Scale" was applied to the students in the sample. The data collection tools used in the research were from Sarmusak (2011). For all scales, the scoring of the items follows the 3-point Likert type scale as: "always" (3), "occasionally" (2), and "never" (1). In negative statements, the scoring followed the opposite direction. Comments are organized and

translated into a measurement throughout the construction of the Scale. The data collection tools and their features used in the study are below.

Honesty Value Acquisition Scale

The Scale is one-dimensional and consists of 9 items—the load values of the items in the scale range between .328 and .689. The Cronbach alpha internal consistency coefficient was calculated using item analysis to verify the reliability of the researchers' scale scores. The reliability level of the Scale is .880. In this study, the reliability level of the Scale was .869.

Love Value Acquisition Scale

The Scale is one-dimensional and consists of 14 items—the Load values of the items in the scale range between .325 and .715. The Cronbach alpha internal consistency coefficient was calculated using item analysis to verify the reliability of the researchers' scale scores. The reliability level of the Scale is .773. In this study, the reliability level of the Scale was .826.

Respect Value Acquisition Scale

The Scale is one-dimensional and consists of 11 items—the load values of the items in the scale range between .412 and .679. The Cronbach alpha internal consistency coefficient was calculated using item analysis to verify the reliability of the researchers' scale scores. The reliability level of the Scale is .732. In this study, the reliability level of the Scale was .772.

Helpfulness Value Acquisition Scale

The Scale is one-dimensional and consists of 12 items—the load values of the items in the scale range between .388 and .644. The Cronbach alpha internal consistency coefficient was calculated using item analysis to verify the reliability of the researchers' scale scores. The reliability level of the Scale is .834. In this study, the reliability level of the Scale was .851.

Application Process of the Research

This research was conducted in three stages: preliminary preparations before application, integration of disciplines, lesson plan preparation, and actual application.

Preparations before application

Before implementation, the researchers studied the literature on integrated curriculum methods and an integrated lesson plan (Fogarty, 1991; Loepp, 1999; Drake & Burns, 2004). And the shared model, one of the multidisciplinary models included in

Fogarty's (1991) interdisciplinary approach model, was used in this study. In the study, the shared model assisted in making the integrated mathematics and life sciences lesson functional. The literature review contains the class plans to be prepared and the activities included in the plans (Beane, 1991; Drake & Burns, 2004; Işık Tertemiz, 2004; Yıldırım, 1996). Additionally, a thorough examination of primary school 3rd-grade mathematics and life sciences lesson curricula consulted field experts and primary school 3rd-grade teachers. The most appropriate content and accomplishments came from expert opinions. Then the achievements were associated with an 8-week-long application curriculum, taking the time allocated to achievements and content into account. Finally, the experimental group, which received integrated mathematics and life sciences teaching, and the control group, which received instruction using the Ministry of National Education-approved course and workbook, were randomly selected from two third-grade primary school classes.

Integration of disciplines and preparation of lesson plan

The curriculum utilized the following steps: choosing a format, defining a title or topic, brainstorming using the concept wheel, generating key questions, integrating key questions with skills and assessments, organizing daily activities, and conducting final evaluations. Before designing the curriculum using an interdisciplinary approach, teacher interviews assessed the research group's students' levels, characteristics, and needs. Subsequently, tolerance was chosen as the theme name because it symbolized the shared integration model and brought the qualities of honesty, respect, love, and helpfulness together under a single framework. Mathematics and life science achievements were analyzed after conducting the required preliminary examinations and ensuring compliance with applicable environmental standards. While making these analyses, the researcher and two field expert academics determined the achievements integrated with a joint decision. Another stage was reaching a consensus with the application classes' teachers by discussing the selected achievements to be incorporated. Then, question design encouraged students to learn natural connections across disciplines. Thus, it is easier for students to understand the administrative center of the unit. During a subsequent stage, evaluation activities established natural links across disciplines and associated these links with the achieved results. The lesson plans developed with this stage began with an introduction (attracting attention, initiating prior knowledge, motivating, informing about the target) for the achievements. They included (the course duration, the theme, achievement definitions, the method, technique, and strategy). And then, it was meticulously designed, with sections for development (activities, interim summaries, interim transitions, and sections for the conclusion (final summary, re-motivation, closing, evaluation).

Additionally, activities that included value teaching according to the associated achievements were designed and distributed in conjunction with the 8-week curriculum, considering the teaching periods specified and expert opinions. At the same time, eight-week lesson plans ran concurrently with eight weeks of practice, which were within the framework of the designed theme. Each project consists of one week of integrated mathematics (5 lesson hours) and life sciences (3 lesson hours). A total of 64 lesson hours resulted from 8 lessons planned at 8 hours each. Curriculum implementation was in the

pilot within the framework of a one-week project. The results were favorable in terms of time management, the appropriateness of the activities for the students' levels, and the evaluation of students' attitudes about the lesson itself.

Actual application

This study was planned as 8-week quantitative research for 3rd graders in primary school. During the foremost application step of the study, the "Honesty Value Acquisition Scale," "Love Value Acquisition Scale," "Respect Value Acquisition Scale," and "Helpfulness Value Acquisition Scale" was applied in the experimental and control groups for pretest applications. As the application process took place, the researcher carried mathematics and life sciences lessons in the experimental and control groups. The researcher integrated mathematics and life sciences lesson activities prepared in the experimental group in this context. In contrast, the teacher's guidebooks and student books were the control group to teach the lessons. At the end of the eight-week application, the "Honesty Value Acquisition Scale," "Love Value Acquisition Scale," "Respect Value Acquisition Scale," and "Helpfulness Achievement Scale" was re-applied to the experimental and control groups as a post-test. The SPSS-26 program analyzed collected data; the results are under the heading.

Data analysis

The experimental and control groups' pretest and post-test scores identify a statistically significant difference between the dependent and independent variables in the study and normal distribution using various criteria. In this context, since the group size of each of the independent variables is above thirty (30), Shapiro-Wilk values, Skewness-Kurtosis values, coefficients of variation, histogram graphics, Detrended Normal Q.Q. Plot graphics, Normal Q.Q. Plot graphics and Boxplot graphics helped understand whether the data show a normal distribution in the analysis. In conclusion, the Dependent Sample t-Test and Independent Sample t-Test found normal distribution.

Ethical considerations

In this study, all rules fall within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive." None f the actions displayed under the title "Actions Against Scientific Research and Publication Ethics," the second part of the directive, were taken.

Ethical review board name: Kırşehir Ahi Evran University Social and Human Sciences Scientific Research and Publication Ethics Committee

Date of ethics review decision: 16.09.2021

Ethics assessment document issue number: 2021/6/11

RESULTS

Presentation of findings occurs under the following sub-headings, which correspond to the information gathered regarding the root values (honesty, respect, love, and helpfulness) discussed in the research.

Comparison of Experimental and Control Group Students' Post-Test Mean Scores on the "Honesty Value Acquisition Scale"

The sub-problem of the research is as follows: *Is there a significant difference between the post-test mean scores of the "Honesty Value Acquisition Scale" belonging to the students in the experimental group and the control group?".*

The normal distribution of the data found there was a statistically significant difference between the mean scores on the " Honesty Value Acquisition Scale" post-test of students in the experimental group and the control. The data showed normal distribution, and the "independent sample t-test" was used.

Table 5. *Independent Sample t-Test Results of Experimental and Control Group Students' Post-Test Scores of Honesty Value Acquisition Scale*

	N	X̄	sd	se	sd	t	p
Experimental	32	2.78	.11	.02	64	-1.365	.177
Control	34	2.83	.17	.03			

p>.05

After conducting an "independent sample t-test," it was discovered that there is no statistically significant difference between the post-test mean scores of the Honesty Value Acquisition Scale obtained by students in the experimental group that received integrated mathematics and life sciences instruction in the third grade of primary school and the control group that received instruction based on the course and workbook approved by the Ministry of National Education (t_{64}=-1.365; p>.05).

Comparison of Experimental Group Students' Pretest and Post-Test Mean Scores on "Honesty Value Acquisition Scale"

The sub-problem of the research is as follows: "*Is there a significant difference between pre-and post-test mean scores on the "Honesty Value Acquisition Scale" for students in the integrated mathematics and life sciences of third-grade primary school?*

Normal distribution of the data examined whether there is a significant difference between the pretest and post-test mean scores of the experimental group's primary school third-grade students in integrated mathematics and life sciences on the "Honesty Value achievement Scale." The data showed a normal distribution, and the "dependent sample" t-test" was applied. Table 6 lists the dependent sample t-test results.

Table 6. *Dependent Sample t-Test Results of the Experimental Group Students on the Pretest and Post-Test of Honesty Value Acquisition Scale*

	N	X̄	sd	se	sd	t	p
Pretest	32	1.50	0.31	0.05			
Posttest	32	2.78	0.11	0.02	32	- 19.698	.000

p<.05

Table 6 analysis results showed a significant difference between the pretest and post-test mean scores of the Honesty Value Acquisition Scale belonging to the 32 primary school 3-grade students in the experimental group. Integrated mathematics and life sciences teaching were (t_{32}=-19.698; p<0.05). Since the post-test arithmetic mean (2.78) of the Honesty Value achievement Scale of the experimental group students is higher than the pretest arithmetic mean (1.50) of the Honesty Value Acquisition Scale, the significant difference is in favor of the post-test.

Comparison of Control Group Students' Pre-Test Post-Test Mean Scores on "Honesty Value Acquisition Scale"

The sub-problem of the research is as follows: "*Is there a significant difference between the pretest and post-test mean scores of the control group students on the "Honesty Value achievement Scale"?*

The normal distribution of the data examined whether there is a significant difference between the "Honesty Value Acquisition Scale" pretest and post-test mean scores of the control group's primary school third-grade students in integrated mathematics and life sciences. The data showed a normal distribution, and the "dependent sample" t-test" was applied. Dependent sample t-test results are in Table 7.

Table 7. *Dependent Sample t-Test Results of the Control Group Students on Pre-Test and Post-Test of Honesty Value achievement Scale*

	N	X̄	sd	se	sd	t	p
Pretest	34	1.59	0.39	0.67			
Posttest	34	2.83	0.17	0.29	33	-17.035	.000

p<.05

The pretest and post-test mean scores of the Honesty Value Acquisition Scale for the 34 students in the control group (t_{33}=-17.035; p0.05), demonstrate a significant difference (t_{33}=-17.035; p0.05). Since the post-test arithmetic mean (2.83) of the Honesty Value

Acquisition Scale belonging to the experimental group students is higher than the pretest arithmetic mean (1.59), the significant difference favors the post-test. This result proves that mathematics and life sciences teaching implemented in the third grade with the conventional approach significantly impact the students' achievement of honesty value.

Comparison of "Love Value Acquisition Scale" Post-Test Mean Scores of Experimental and Control Group Students

The research's sub-problem is: "Is there a significant difference between the post-test mean scores of the "Love Achievement Scale" of students in the experimental group and the control?"

To determine whether there is a statistically significant difference between the mean scores on the "Love Value Acquisition Scale" post-test of the students in the experimental group and the control group, the normal distribution of the data was checked. It was determined that the data showed normal distribution, and the "independent sample t-test" was used—table 8. List the independent sample t-test results.

Table 8. *Independent Sample t-Test Results of Experimental and Control Group Students' Post-Test Scores of Love Value achievement Scale*

	N	X̄	sd	se	sd	t	p
Experimental	32	2.95	.28	.05			
					66	5.053	.000
Control	34	2.64	.22	.04			

P<.05

After conducting an "independent sample t-test," it was discovered that there is a statistically significant difference between the post-test mean scores of the Love Value Acquisition Scale obtained by students in the experimental group and the control group (t_{66}=5.053; p<.05). Because the Love Value achievement Scale (2.95) arithmetic means for the experimental group students was higher than the arithmetic means of the Love Value achievement Scale (2.64) for the control group students, the statistically significant difference was in favor of the experimental group students. Using this difference as evidence, we may conclude that integrated mathematics and life sciences activities implemented in the third grade of primary school significantly impact students' achievement of love value.

Comparison of Experimental Group Students' Pre-Test & Post-Test Mean Scores on the "Love Value Acquisition Scale"

The sub-problem of the research is as follows: *"Is there a significant difference between the pretest and post-test mean scores* of the *"experimental group students"* on the Love Value Acquisition Scale?"

To determine whether there is a statistically significant difference between the mean scores on the "Love Value Acquisition Scale" pretest and post-test of the students in the experimental group, the normal distribution of the data was checked. It was determined that the data showed normal distribution, and the "dependent sample t-test" was used. — table 9 lists dependent sample t-test results.

Table 9. *Dependent Sample t-Test Results of the Experimental Group Students on the Pretest and Post-Test of Love Value achievement Scale*

	N	X̄	sd	se	sd	t	p
Pretest	32	1.67	0.32	0.57			
					31	- 18.062	.000
Posttest	32	2.95	0.28	0.50			

p<.05

Table 9 analysis results showed a significant difference between the pretest and post-test mean scores of the Love Value Acquisition Scale belonging to the 32 primary school 3-grade students in the experimental group was carried out (t_{31}=-18.062; p<0.05). Since the post-test arithmetic mean (2.95) of the Love Value Acquisition Scale belonging to the experimental group students is higher than the pretest arithmetic mean̄ (1.67) of the Love Value Acquisition Scale, the significant difference is in favor of the post-test. This difference can highlight that integrated mathematics and life sciences activities implemented in the third grade of primary school significantly impact students' achievement of love value.

Comparison of Control Group Students' Pre-Test & Post-Test Mean Scores on the "Love Value Acquisition Scale"

The sub-problem of the research is as follows: *"Is there a significant difference between the pretest and post-test mean scores of the control group students on the Love Value Acquisition Scale?*

To test whether there is a significant difference between the "Love Value Acquisition Scale" pretest and post-test mean scores of the control group's primary school third-grade students who were taught integrated mathematics and life sciences; first of all, the normal distribution of the data was examined, and it was determined that the data showed a normal

distribution, and the "dependent sample" t-test" was applied. Table 10 lists the dependent sample t-test results.

Table 10. *Dependent Sample t-Test Results of the Control Group Students on the Pretest and Post-Test of Love Value Acquisition Scale*

	N	X̄	sd	se	sd	t	p
Pretest	34	1.73	0.43	0.73	33	-10.883	.000
Posttest	34	2.64	0.22	0.37			

p<.05

When the analysis results are examined, Table 10 shows that there is a significant difference between the pretest and post-test mean scores of the Love Value Acquisition Scale belonging to the 34 students in the control group (t_{31}=-10.883; p<0.05). Since the post-test arithmetic mean (2.64) of the Love Value Acquisition Scale belonging to the experimental group students is higher than the pretest arithmetic mean (1.73) of the Love Value Acquisition Scale, the significant difference is in favor of the post-test. The difference shows that traditional teaching per the constructivist approach applied in the third grade of primary school substantially affects students' love value achievements.

Comparison of Experimental and Control Group Students' Post-Test Mean Scores on the "Respect Value Acquisition Scale"

The sub-problem of the research is as follows: *"Is there a significant difference between the post-test mean scores of the "Respect Value Acquisition Scale" belonging to the students in the experimental group and the control group?"*.

To determine whether there is a statistically significant difference between the mean scores on the "Respect Value Acquisition Scale" post-test of the students in the experimental group and the control group, the normal distribution of the data was checked. It was determined that the data showed normal distribution, and the "independent sample t-test" was used. Independent sample t-test results are given in Table 11.

Table 11. *Independent Sample t-Test Results of Experimental and Control Group Students' Post-test Scores of Respect Value Acquisition Scale*

	N	X̄	sd	se	sd	t	p
Experimental	32	2.23	.17	.03	64	2.939	.005
Control	34	2.10	.18	.03			

p<.05

After conducting an "independent sample t-test," it was discovered that there is a statistically significant difference between the post-test mean scores of the Respect Value Acquisition Scale belonging to the students in an experimental group and the control group (t_{64}=2.939; p<.05). Since the arithmetic means of the Respect Value Acquisition Scale (2.23) for the experimental group, students were higher than the arithmetic means of the Respect Value Acquisition Scale (2.10) for the control group students; the statistically significant difference was in favor of the experimental group students. This difference shows that integrated mathematics and life sciences activities implemented in the third grade of primary school significantly impact students' achievement of respect value.

Comparison of Experimental Group Students' Pre-Test Post-Test Mean Scores on "Respect Value Acquisition Scale"

The sub-problem of the research is as follows: "*Is there a significant difference between the pretest and post-test mean scores of the experimental group students on the "Respect Value Acquisition Scale"?*

To test whether there is a significant difference between the "Respect Value Acquisition Scale" pretest and post-test mean scores of the experimental group's primary school third-grade students who were taught integrated mathematics and life sciences; first of all, the normal distribution of the data was examined, and it was determined that the data showed a normal distribution and then, the "dependent sample" t-test" was applied. Table 12 lists the dependent sample t-test results.

Table 12. *Dependent Sample t-Test Results of the Experimental Group Students on the Pretest and Post-Test of Respect Value Acquisition Scale*

	N	X̄	sd	se	sd	t	p
Pretest	32	1.67	0.32	0.57	31	-8.129	.000
Posttest	32	2.23	0.17	0.30			

p<.05

Table 12 analysis results showed a significant difference between the pretest and post-test mean scores of the Respect Value Acquisition Scale belonging to the 32 primary school 3-grade students in the experimental group. Integrated mathematics and life sciences teaching was carried out (t_{32}=-8.129; p<0.05). Since the post-test arithmetic mean (2.23) of the Respect Value Acquisition Scale belonging to the experimental group is higher than the pretest arithmetic mean (1.67), the significant difference favors the post-test. This difference shows that integrated mathematics and life sciences activities implemented in the third grade of primary school substantially impact students' achievement of respect value.

Comparison of Control Group Students' Pre-Test & Post-Test Mean Scores on "Respect Value Acquisition Scale"

The sub-problem of the research is as follows: "*Is there a significant difference between the pretest and post-test mean scores of the control group students on the "Respect Value Acquisition Scale"?*

To test whether there is a significant difference between the pretest and post-test mean scores on the "Respect Value Acquisition Scale'" belonging to the control group students; first of all, the normal distribution of the data was examined, and it was determined that the data showed a normal distribution and then, the "dependent sample" t-test" was applied. Dependent sample t-test results are given in Table 13.

Table 13. *Dependent Sample t-Test Results of the Control Group Students on Pre-Test and Post-Test of Respect Value achievement Scale*

	N	X	sd	se	sd	t	p
Pretest	34	1.69	0.20	0.03			
Posttest	34	2.08	0.17	0.03	33	-8.812	.000

p<.05

Table 13 shows that there is a significant difference between the pretest and post-test mean scores of the Respect Value Acquisition Scale belonging to the 34 students in the control group, whose lessons are taught according to the course and workbook approved by the Ministry of National Education (t_{33}=-8.812; p<0.05). Since the post-test arithmetic mean (2.08) of the Respect Value Acquisition Scale belonging to the control group students is higher than the pretest arithmetic mean (1.69) of the Respect Value Acquisition Scale, the significant difference is in favor of the post-test. This difference shows that teaching mathematics and life sciences with a traditional approach substantially increases students' Respect Value Achievements.

Comparison of Experimental and Control Group Students' Post-Test Mean Scores on the "Helpfulness Value Acquisition Scale"

The sub-problem of the research is as follows: *Is there a significant difference between the post-test mean scores of the "Helpfulness Value Acquisition Scale" belonging to the students in the experimental group and the control group?".*

To determine whether there is a statistically significant difference between the post-test mean scores on the "*Helpfulness Value Acquisition Scale*" belonging to the students in the experimental group and the control group, the normal distribution of the data was checked.

Then, it was determined that the data showed normal distribution, and the "independent sample t-test" was applied. Table 14 lists the independent sample t-test results.

Table 14. *Independent Sample t-Test Results of Experimental and Control Group Students' Post-Test Scores of Helpfulness Value Acquisition Scale*

	N	X̄	sd	se	sd	t	p
Experimental	32	2.59	.34	.06			
					64	10.459	.000
Control	34	1.92	.15	.03			

P<.05

After conducting an "independent sample t-test," it was discovered that there is a statistically significant difference between the post-test mean scores of the Helpfulness Value Acquisition Scale belonging to the students in the experimental group that received integrated mathematics and life sciences instruction in the third grade of primary school and the control group that received instruction based on the course and workbook approved by the Ministry of National Education (t_{64}=10.459; p<.05). The Helpfulness Value Acquisition Scale (2.59) for the experimental group students was higher than the arithmetic mean of the Helpfulness Value Acquisition Scale (1.92) for the control group students. The statistically significant difference was in favor of the experimental group students. This difference indicates that integrated mathematics and life sciences activities implemented in the third grade of primary school significantly impact students' achievements of helpfulness value.

Comparison of Experimental Group Students' Pre-Test & Post-Test Mean Scores on the "Helpfulness Value Acquisition Scale"

The sub-problem of the research is as follows: "*Is there a significant difference between the pretest and post-test mean scores of the experimental group students on the "Helpfulness Value Acquisition Scale"?*

To test whether there is a significant difference between the pretest and post-test mean scores on the "Helpfulness Value Acquisition Scale" belonging to the experimental group's primary school third-grade students who were taught integrated mathematics and life sciences; first of all, the normal distribution of the data was examined, and it was determined that the data showed a normal distribution, and the "dependent sample" t-test" was applied. Table 15 lists the dependent sample t-test results.

Table 15. *Dependent Sample t-Test Results of the Experimental Group Students on Pre-Test and Post-Test of Helpfulness Value Acquisition Scale*

	N	X̄	sd	se	sd	t	p
Pretest	32	1.62	0.37	0.66	31	-8.398	.000
Posttest	32	2.59	0.34	0.60			

p<.05

Table 15 analysis results showed a significant difference between the pretest and post-test mean scores of the Helpfulness Value Acquisition Scale belonging to the 32 primary school 3-grade students in the experimental group. Integrated mathematics and life sciences teaching were (t_{31}=-8.398; p<0.05). Since the post-test arithmetic mean (2.59) of the Helpfulness Value Acquisition Scale belonging to the experimental group students is higher than the pretest arithmetic mean (1.62) of the Helpfulness Value Acquisition Scale, the significant difference is in favor of the post-test. This difference can highlight that integrated mathematics and life sciences activities implemented in the third grade of primary school significantly impact students' achievement of helpfulness value.

Comparison of Control Group Students' Pre-Test & Post-Test Mean Scores on the "Helpfulness Value Acquisition Scale"

The sub-problem of the research is as follows: "*Is there a significant difference between the pretest and post-test mean scores of the control group* students *on the "Helpfulness Value Acquisition Scale"?*

To test whether there is a significant difference between the pretest and post-test mean scores on the "Helpfulness Value Acquisition Scale" belonging to the control group,; first of all, examined the normal distribution of the data, which identified a normal distribution and then, the "dependent sample" t-test" was applied. Table 16 lists the dependent sample t-test results.

Table 16. *Dependent Sample t-Test Results of the Control Group Students on Pre-Test and Post-Test of Helpfulness Value achievement Scale*

	N	X̄	sd	se	sd	t	p
Pretest	34	1.72	0.50	0.86	33	-2.012	.052
Posttest	34	1.92	0.15	0.26			

p>.05

According to the results of the "independent sample t-test," it is seen that there is no significant difference between the pretest and post-test mean scores of the control group

students who were taught according to the course and workbook approved by the Ministry of National Education on the Helpfulness Value Acquisition Scale (t33=-2.012; p>.05). The mathematics and life sciences lessons taught according to the course and workbook approved by the Ministry of National Education do not significantly affect the Helpfulness Value Achievements of the control group students during the implementation.

DISCUSSION and CONCLUSION

There was a significant difference in favor of the experimental group between the primary school third-grade students in the experimental group compared to the control group students. This result shows that integrated mathematics and life sciences teaching is significantly more effective than the current practice in increasing students' respect, love, and helpfulness values. In addition, students in the experimental group favored the post-test between the pretest-post-test scores of the honesty, respect, love, and helpfulness values belonging to the students in the experiment. In this context, integrated mathematics and life sciences teaching increase the students' achievement levels of being honest, respectful, love and helpful at a positive level. Indeed, Aslan (2017) and Aladağ (2009) found that integrated education enhances students' value tendency levels in their studies. Generally, the research results are similar to the studies in the literature.

With an integrated teaching method, it is critical to approach processes in a more structured and planned manner while still taking into account the necessities of social life and the society's expectations from individuals (Weidenfeld, 2002; Coşkun & Yıldırım, 2009). The relationship between behavior and value can be evaluated in various ways, depending on the methodologies used by multiple disciplines (Keskin, 2014). As a result of this understanding, the integrated teaching approach enables students to synthesis numerous fields with distinct aspects, expanding their perspectives and increasing their achievement of honesty, respect, love, and helpfulness values. In this way, this study demonstrates that integrating life sciences and mathematics courses around tolerance matches expectations for enhancing the honesty, respect, love, and helpfulness values stated in the literature.

On the other hand, the effectiveness of the applied integrated curriculum is the significant difference in favor of post-tests between the pretest and post-test scores on the honesty, respect, and love value scales belonging to the experimental group in which mathematics course integrated with the life sciences course, and the control group (independently taught studies) according to the class and workbook approved by the Ministry of National Education. The experimental group and the control group according to the course and workbook approved by the Ministry of National Education, the student's achievement levels of honesty, respect, and love values increased significantly.

This study determined no significant difference in the level of honesty value acquisition between the experimental group and the control group. In addition, students in the control group did not increase the value of helpfulness during the application period of

the research. As a result, the cause for this is linked to the duration of the application because the acquisition of affective acquisitions may take a long time. Sam and Ernest (1997) classified values as epistemological, social and cultural, and personal. They described the importance of justice, helpfulness, and honesty, which they categorized as social and cultural values, as values that disclose individuals' responsibilities to society. In this sense, the reason for the difference between the post-test mean scores of the experimental group and the control group and the lack of significant difference between the pretest and post-test mean scores of the control group students can explain the fact that, while subjects were integrated into the experimental group using the integrated curriculum, the values were transferred to students more effectively through activities centered on the tolerance value chosen as a theme appropriate for the research. On the other hand, in the control group, we can deduce that the honesty value did not find a good place in the curriculum.

Another point of view is that effective learning takes longer than cognitive and psychomotor learning. Farrer (2000) and Ernest (1989) highlight that subject taught and the learning methods selected follow the values for students to acquire adequate understanding. Moreover, according to Hawkes (2007), it is feasible for students to learn values by developing relationships with the natural and problematic situations that arise from their participation in social life. Considering this condition, it is possible to explain why there was no statistically significant change between the pretest and post-test mean scores of control group students on the helpfulness value acquisition scale.

The applied mathematics and life sciences curricula have been created with a constructivist approach. However, the curricula' values were given as root values and were not associated with the achievements. Even though it has received a great deal of criticism in this regard, several studies have demonstrated that lessons delivered in line with the nature of constructivist understanding lead to an increase in the value tendency levels of students (Köstekçi, Kurupınar, & Kıral, 2016; Demir, 2018). As a result, the increased value tendency levels favoring the post-test t in the research's control group supports the literature. The effectiveness of the integrated curriculum applied in this study explains the significant difference between the achievement levels of respect, love, and helpfulness values of the experimental group students and those levels of the control group students.

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Research

On the effectiveness and limitations of captioning in L2 listening

Saadet Korucu-Kış [1]

Abstract:

Listening is often perceived to be the most challenging skill by second/foreign language (L2) learners. Due to its real-time nature, L2 listeners experience several comprehension problems related to the processing of aural input. To scaffold L2 listening, captioning is commonly used since the dual coding of aural and written stimuli is expected to make L2 input more comprehensible leading to more in-depth processing. However, a survey of the extant literature precludes us from drawing firm conclusions about the effectiveness of captioning since in some circumstances captions were found to have no significant effect on listening comprehension. So, the question of whether captions function as a comprehension aid in L2 listening remains inconclusive. Hence, adopting a narrative literature review methodology, the present study aims to contribute to this inconsistent research area by clarifying some of these issues answering the following questions: (1) Is captioning really effective in L2 listening?, (2) Does captioning always work for L2 listening?, and (3) Why is research on captioning in L2 listening still inconclusive? Based on the insights gained, it is concluded that the mere presence of captions does not necessarily lead to improved comprehension. Captioning effectiveness is influenced by learner, material, measurement, task, and L1/L2 characteristics. Implications arising are discussed.

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INTRODUCTION

Listening has been a neglected skill within applied linguistics for a long time (Vandergrift, 2007). Traditionally, it was regarded as a natural skill that developed over time and did not need to be taught. It was reckoned to be an effortless process through which a listener passively received the incoming input (LeLoup et al., 2007). However, with advances in the fields of recording technology, telecommunications and information processing, computational science and cognitive psychology, transpersonal psychology, globalism and anthropology, organizational behavior, computer technology, and digital networking, the characterization of listening has changed markedly. Moving away from being perceived as a mere act of passive reception, it has come to be viewed as an active process through which listeners construct, represent, negotiate, and create meaning individually or in collaboration with others through imagination, participation or empathy (Rost, 2011). In other words, it has now been well recognized that listening is an interpretive process through which L2 learners actively engage in "constructing meaning based on expectations, inferences, intentions, prior knowledge, and selective processing of the input" (Richards, 2005, p. ix).

Listening is critical to the process of language acquisition as the amount and quality of aural exposure to the target language influences language learners' overall L2 proficiency. Vandergrift (2003) points out that prioritizing listening comprehension especially in the early stages of language instruction provides a more naturalistic approach to acquire the target language. According to Brett (1997), this will involve learners in an implicit process which enables them to internalize the new language and automatically reproduce it. Similarly, Gary and Gary (1981) state that engaging language learners in substantial listening comprehension practices offers several benefits for language development such as cognitive, affective, communicative, and utility benefits. The authors further maintain that developing substantial listening competence in learners before requiring production (a) prevents cognitive load and prepare learners to produce the material without language interference, (b) reduces stress, (c) increases the potential for communicative acts, and (d) enhances self-confidence, which may, in turn, results in autonomous study practices. In similar veins, Vandergrift (2007) states that language learners' competency in listening plays a central part in the development of other skills. To illustrate, Richards (2008) indicates that listening can be viewed as the initial step of communication and much of the input needed for oral production is provided by it. In his review study, Jones (1997) contends that listening plays a critical part in pronunciation development and will continue to be one of the effective means of pronunciation training through different tasks with a diversity of accents. Highlighting the reciprocal relationship between listening and vocabulary knowledge, Stæhr (2009) concludes that there is a strong association between listening and vocabulary knowledge. He furthers that while vocabulary size may significantly contribute to learners' listening comprehension, use of different listening strategies may increase their lexical level. As to the relationship between listening and grammatical knowledge, De Jong (2005)

concludes that substantial listening can support students' implicit learning of linguistic structures.

In view of these observations, listening can be said to hold a central position in the language acquisition process. Yet, due to its multidimensional and complex nature, it poses serious challenges to language learners while processing auditory input (Yang & Chang, 2014). Wipf (1984) states that listening requires discriminating between sounds, recognizing words and linguistic forms, identifying intonation and stress, recalling, and interpreting meaning within the immediate and broader context of the utterance. According to Goh (2000), this real-time processing of data causes several comprehension problems related to the cognitive processes of perception, parsing and utilization. L2 listeners may not understand grammatical structures or lexical items, or they may forget what is heard or they may understand the individual words but not the intended message. In a similar sense, Yang and Chang (2014) point out that the real-time nature of listening does not allow learners to control the speed of ongoing streams of speech at their own pace. Feeling precipitous to understand the aural input, learners get stressed. Their working memory is overloaded and disables them to process the continuing acoustic messages. As a result, L2 listening is often perceived to be one of the most difficult language skills in practice. Particularly, in foreign language environments, it may become a source of frustration for learners given the lack of a real-world English practicing context. After all, since L2 learners' listening skills can be improved through practice, one way to help L2 learners overcome the listening difficulties is to scaffold their listening skills development by means of richer and authentic learning sources.

Audiovisual media such as feature films, drama series, sitcoms, documentaries, news, game shows and so forth can help create rich and authentic learning environments for learners (Danan, 2004). Moreover, the input provided by this media meets the five criteria outlined by Nation and Newton (2007) for suitable input. In that, audiovisuals can offer (a) familiar content, (b) interesting and engaging topics, (c) comprehensible materials, (d) contextual hints to construct meaning, and (e) large quantities of input for processing. Providing learners with multisensory experiences, they can have an attentional, emotional and motivational influence on them (Baltova as cited in Danan, 2004). The contextual, visual and non-verbal cues available in audiovisual materials can assist L2 listeners to compensate for any comprehension deficiency resulting from the provision of audio-only input (Brett, 1995).

The potential benefits of audiovisual materials for the facilitation of input processing can also be increased by means of captioning technology. Due to the visual support captions provide, L2 listeners can link what they hear to the on-screen text. They can easily break down continuous speech streams, recognize words, understand form-meaning connections, and identify meaningful speech units. The dual coding of aural and written stimuli makes L2 input more comprehensible leading to more in-depth processing. This, in turn, enhances confidence, allays anxiety and provides motivation, which is in the long run expected to

develop L2 learners' listening comprehension (Hsieh, 2020, Leveridge & Yang, 2013; Winke et al., 2013). In this respect, there is a commonsense assumption that captions improve performance and have a positive impact on listening skills (Markham & Peter, 2003) However, a comprehensive review of the extant literature (e.g. Caimi, 2006; Robin, 2007; Taylor, 2005) precludes us from drawing firm conclusions about the effectiveness of video captioning since in some circumstances captions were stated to have no significant effect on listening comprehension due to such reasons as concentration on reading the text rather than listening to the audio, heavy reliance on the text, overloaded working memory, and learner perception of captions as a source of distraction (e.g. Diao et al., 2013; Hui, 2007; Montero-Perez et al., 2013; Zanon, 2006). So the question of whether captions function as an aid or hindrance to the development of listening comprehension remains controversial. Based on a survey of primary research in the area, this brief article aims to contribute to this inconsistent research field by clarifying some of these issues answering the following questions: (1) Is captioning really effective in L2 listening?, (2) Does captioning always work for L2 listening?, and (3) Why is research on captioning in L2 listening still inconclusive?

METHOD

A narrative literature review was conducted to summarize primary research on the effectiveness of captioning in L2 listening. Baumeister and Leary (1997) state that one of the goals of narrative literature reviews is "to reveal problems, weaknesses, contradictions, or controversies in a particular area of investigation" (p. 312). According to the authors, literature reviews that focus on problem identification do not require full-size review of literature. Based on a representative cover of past work, the researcher "may venture some tentative solutions to the problems he or she identifies but is more concerned with simply informing the field that some difficulty exists", brings up more questions than s/he can respond to and leaves "it to future researchers to straighten out the mess" (p.312). Accordingly, drawing on a number of key studies—mostly referring to the works of leading researchers and most frequently cited articles in the field—, the current study aimed to identify the issues underlying the inconclusiveness in the area of captioning effects on L2 listening.

RESULTS AND DISCUSSION

Is Captioning Really Effective in L2 Listening?

Captions, also known as uni-lingual (Vanderplank, 1990), intralingual (Williams & Thorne, 2000), or same-language subtitles (Bird & Williams, 2002) refer to "on-screen text in a given language combined with a soundtrack in the same language" (Markham et al., 2001, p. 440). Primarily designed for individuals with hearing disabilities, captions have readily come to be used for language learners who are "hard of listening" since the early 1980s (Vanderplank, 1988, p. 272). One of the reasons that captioned viewing was heralded in L2 listening contexts emanates from information processing theories and SLA hypotheses.

Regarding the former, Paivio's (1986) dual coding theory and Mayer's (2005) cognitive theory of multimedia learning suggest that the use of two different modes of stimuli activate two separate systems (verbal and visual) that interact. The activation of both systems is expected to enhance information processing which subsequently results in better comprehension. From this viewpoint, onscreen text and soundtrack in captioned videos help learners code the information dually leading to more in-depth processing and higher level of recall. As to the latter, Schmidt's (1990) noticing hypothesis, and Krashen's input and affective filter hypotheses can particularly be referred to. The noticing hypothesis proposes that attending to certain features in input is a prerequisite for converting input into intake. In this sense, captions can help L2 listeners notice some rules, word forms or meaning units, lead them from unknown to known, and subsequently contribute to their listening comprehension fluency. According to Krashen's (1985) aforementioned hypotheses, a language can be acquired through understanding messages in low-anxiety environments. In light of this, Yang and Chang (2014) state that captions make incomprehensible continuous streams of speech comprehensible by the scaffolding effect they bring into auditory processing and alleviate some of the anxiety experienced by learners when listening to "native speakers each with their own slang, reduced speech, stress, accents and dialects" (Seferoğlu, 2008, p. 1).

In addition to theoretical support, empirical research also highlights the effectiveness of captions in L2 listening comprehension. To start with, Garza (1991) carried out an experiment with 70 English as a second language and 40 Russian as a foreign language university students to compare the comprehension test results of caption and no-caption groups. Having viewed a number of video segments with differing lengths, participants were tested through a multiple choice comprehension quiz. Results revealed that captions facilitated the comprehension of video segments for caption group and they significantly outperformed the no-captions group. In his study, Markham (1999) inquired into the effects of captioned viewing on 118 advanced ESL learners' aural word recognition. The materials included excerpts from two different TV programs lasting between 12 to 13 minutes. Having watched the videos once, the participants took a 50-item multiple choice test administered orally. The findings showed that captions enabled learners to identify more words and improved their listening skills to recognize words. Similarly, Huang and Eskey (1999) investigated the effects of captioned TV watching on intermediate level ESL learners' listening comprehension. The study included 30 participants and they were equally and randomly distributed among closed-captioned TV condition and no-captioned TV condition. Each group watched an episode from a TV series designed for ESL classrooms and took a listening test consisting of sixteen multiple-choice items. The researchers found that students who watched the program with full captions outscored their counterparts in the listening comprehension test.

Unlike previous studies, Guillory (1998) set out to explore how different modes of captioning (i.e. full captions, keyword captions and no captions) would impact learners'

listening comprehension. The participants consisted of 202 beginning second language learners. They were randomly assigned to three groups: full text captions treatment, keyword captions treatment and no captions group. The results of the experiment revealed the positive effects of both full captions and keyword captions treatment on listening comprehension compared to no caption condition. However, the subsequent post-hoc analysis demonstrated no significant difference between full caption and key-word caption groups. The researcher concluded that since keyword captioning presents words essential to the meaning, it provides beginning learners with less to read and does not overload their listening processing capacities.

With their study in 2001, Markham et al. attempted to broaden the scope of research on captioning by comparing the effects of intralingual subtitles (i.e. captions), interlingual subtitles (i.e. L1 on-screen text and L2 soundtrack) and no subtitles on listening comprehension. The participants of the study were 169 intermediate-level university students learning Spanish as a second language. The material comprised a 7-minute listening passage. The participants were randomly divided among interlingual subtitles condition, intralingual subtitles condition and no subtitles condition. The subsequent listening-based comprehension tests aimed to measure both global understanding through a written summary of video content and detailed understanding via a 10-item multiple choice test. The students in treatment groups outscored significantly higher than their counterparts in non-treatment group. However, the results also showed that the interlingual subtitles group outperformed the intralingual subtitles group. In view of this, the authors advocate for the graded use of multilingual captions to enhance L2 learners' listening comprehension. In a recent study, Hayati and Mohmedi (2011) also conducted a study to analyze the effects of intralingual subtitles, interlingual subtitles and no subtitles on students' listening comprehension. The participants were 90 intermediate level learners of English. The material consisted of six segments (each approximately five minutes in length) from two episodes of a documentary film. The study lasted for six weeks and students took a ten-item multiple choice test after each session. The researchers found that both treatment groups had significantly higher scores than the no caption group; yet, the intralingual group performed at a considerably higher level than the interlingual group. The researchers conclude that the additional process of translation while viewing captioned videos may cause listeners to lose track of second language audio track and therefore lowers the effectiveness of interlingual subtitles.

Winke et al. (2010) investigated the impact of captioning on the comprehension of other languages than English. The authors also examined the effects of captioning order and proficiency differences on the effectiveness of captioning. The participants were a total of second or fourth year foreign language learners of Russian and Spanish and second year learners of Chinese and Arabic. The materials included three documentaries which were 3-5 minutes long. After watching the videos twice in a randomized order, the participants sat for a multiple choice comprehension test. As a further note, the learners of Spanish were

divided into two additional groups in the study. While one group watched the videos twice with captions, the other watched them without captions. In line with their aims, the authors came up with four main findings. First, Spanish learners who watched the videos twice with captions performed significantly higher than the no caption group in the listening test. Second, the effect of the order of captions was not found to be influential in improving learners' listening comprehension. Yet, when the orthographic differences were considered, the ordering of captions was found significant. While Russian and Spanish learners did better when the captions were presented first, Arabic and Chinese learners seemed to process aural input better during their second exposure to the captions despite a lack of consistency in test scores. Finally, the study revealed that the impact of captioning order on learners' performance was not influenced by proficiency differences.

In their experimental study, Yang and Chang (2014) focused on exploring whether different modes of captioning might influence L2 learners' listening ability of reduced forms frequently appearing in colloquial English. Assigning 44 intermediate-level learners of English to full, keyword-only, and annotated keyword captions "(a format similar to pictorial presentation)" (Yang & Chang, 2014, p. 51) groups randomly, the researchers also examined pre- and post-test scores of the participants to measure their overall comprehension improvement. The materials included 51 video clips whose duration ranged from 30 to 120 seconds. Analysis results indicated that all three groups improved on their score from pre- to post-test, with the annotated key word caption group outscoring the full caption and the keyword-only caption groups, particularly in the recognition of reduced forms. The findings of the study suggested that the use of keyword captioning modes can work better than full captioning in the instruction of reduced forms which is closely related to the improvement of learners' overall comprehension competence.

In a 2017 study, Rodgers and Webb drew attention to the fact that existing research on captioning often leveraged short videos and the use of full-length TV programs that students most often watch in their out-of-class time remained largely untapped. To address this gap, the researchers conducted an experiment with 372 pre-intermediate to intermediate level university students. The L2 learners assigned to full-caption and no-caption conditions watched ten 42-minute episodes of a TV program and took a total of ten comprehension tests consisting of true/false, multiple-choice and sequencing items. The results indicated that the full-caption group had slightly better test scores compared to no-caption group across all episodes; yet, a significant difference was observed only for the episodes of one, four and seven between the test scores of two groups. These findings imply that captions can be especially useful when viewing the material for the first time and video content is comparatively difficult.

More recently, Teng (2019) examined the effects of different types of captioning (i.e. full captions, keyword captions and no captions) on 182 primary school students' comprehension of video content. The researcher also investigated the effects of proficiency level (high vs. low), and viewing frequency (once or twice) on video content comprehension.

The students were randomly distributed among three groups. The materials were two short videos from two different stories, each approximately 10 minutes in length. The measures included a written recall protocol instrument for testing global comprehension and a multiple-choice test for testing detailed comprehension. Overall, the results revealed that full captioning helped primary school students comprehend better than keyword or no captioning since full captions allowed children to construct better connections between events. Second, higher proficiency learners outperformed low proficiency learners in each condition. Finally, viewing frequency significantly influenced the comprehension of the video content.

Taken as a whole, these studies reveal that captions positively and significantly influence listening comprehension. Although one mode (i.e. full captioning, keyword captioning and annotated keyword captioning) or type (i.e. interlingual and intralingual) of captions may show superiority over others under different conditions, L2 learners in captioned viewing groups generally have substantial gains in listening comprehension compared to learners who are not exposed to any captioning condition.

Does Captioning Always Work for L2 Listening?

Although there is ample evidence that captioning facilitates aural comprehension process, it should be evident that captioning is not a panacea. Some research on captioned viewing has revealed that captions do not consistently profit L2 listeners in all cases. One of the theories often referred to in order to explain why captions can be a hindrance to aural input processing is Mayer's (2005) cognitive theory of multimedia learning. The redundancy principle of this theory suggests that the concurrent presentation of audio, imagery, and captions causes learners to divide their attention across three information channels and increases the decoding load (Montero-Perez et al., 2013). In a similar vein, Diao et al. (2007) state that captions function as a source of distraction and retard the development of L2 listening since the simultaneous presentation of multiple stimuli imposes a heavy demand on short-term memory. From a different perspective, Hui (2007) contends that captions causes text reliance in L2 listeners. Likewise, Zanon (2006) notes that students are largely inclined to focus on reading captions rather than listening to the soundtrack during captioned viewing. Furthermore, in a review study, Danan (2004) indicates that heavy dependence on on-screen texts creates a form of laziness and may not contribute to improved listening abilities.

To illustrate these issues with reference to more empirical studies, Hsieh (2020), for instance, investigated how different types of video captioning affected English as a foreign language (EFL) students' listening comprehension. The participants were 105 low-intermediate university students. The learners were randomly assigned to the following captioning conditions: no captions, full captions with no audio, full captions, full captions with highlighted target words and full captions with highlighted target words and L1 gloss. The materials were two 4-5 minute long English animations. For each video, they completed

a comprehension test consisting of ten multiple-choice items. The findings of the study showed that there was no significant difference between treatment groups in terms of listening comprehension. The author explains this result by video difficulty. Even though captions provide the textual support, low-intermediate learners may get difficulty in processing the aural input. The results also demonstrated that despite a lack of statistical difference between groups, no captions group was slightly better at listening comprehension than their counterparts. The author accounts for this finding referring to modality effect. More specifically, the absence of on-screen text had reduced the extra load in the visual system and the aural input was solely processed by the auditory channel.

Adding annotations to captioned animated videos, Aldera and Mohsen (2013) examined whether learners' listening comprehension differed under the following three conditions: animation-only, animation and captions, and animations, captions and keyword annotations. A total of 50 high-beginner EFL university students were recruited for the study. The material included an animated story. The participants took a five-item multiple-choice test and listening recall test just after watching the animation. After four weeks, the instructors administered delayed tests identical to the previous tests taken by the participants. The results revealed that the participants in the animation-only condition had outperformed the other treatment groups in both of the listening comprehension tests and recall tests. The authors attribute the negative effects of captions and annotated keywords to the attention split between three different types of stimuli and imposing cognitive burden, which result in comprehension decrements.

In their study, Bairstow and Lavaur (2012) explored whether proficiency and different types of captions (interlingual, intralingual and no subtitles) would make any difference to participants' comprehension. The participants were a sample of 90 secondary school students and they were divided into three groups. The material was an approximately 9-minute excerpt from a full-length film. Immediately after watching the video, the participants took a comprehension test consisting of multiple-choice questions. The authors stated that while interlingual subtitles facilitated video comprehension for low proficiency learners, the advanced-level learners found both intralingual and interlingual subtitles distracting. These findings suggest that captions may be found distracting if they are not needed; yet, they are perceived beneficial if needed.

Montero-Perez et al. (2014a) examined how different captioning types would affect L2 learners' comprehension of video content. The participants were 133 (higher-) intermediate undergraduates and divided among four conditions: full captions, partial captions, no captions, and full captions with highlighted keywords. The materials included three short clips. Three comprehension tests were developed based on the content of the video clips. The tests aimed to measure global understanding, detailed understanding and inference ability through open-ended, true/false and combination items. The results suggested no significant difference between the test scores of captioning and no captioning groups. These findings were accounted for by the content and difficulty level of the tests. The authors

further explained that unchallenging test items inquiring into factual information reduced the comprehension difference between the groups.

In a 2010 study on captioned viewing, Sydorenko examined the effects of captions, visuals and audio on learners' attention to input. Twenty-six beginning level university students were recruited for the study. They were divided into three condition groups: video with captions, video with audio, and video with audio and captions. The materials included three video clips from a comedy series, each 2-3 minute in length. After watching the video clips, the students were asked to rate the amount of attention they directed to captions, audio and video. They were also requested to rate the usefulness of these different types of stimuli. The authors found that the video with captions and the video with audio and captions groups focused more on captions than on video. The video with audio group, on the other hand, paid equal amount of attention to audio and video. As to the utility of the captions, visuals and audio for video comprehension, the video with audio and captions group found the audio to be the least useful. These findings indicate that learners largely relied on reading captions to comprehend the video, closely followed by their use of visual images, with listening being the least-utilized channel. Winke et al. also obtained similar results in their 2013 study conducted with 33 (low-) intermediate English learners of Arabic, Chinese, Spanish and Russian. The study investigated caption reading behaviors of L2 learners while also analyzing the relationship between the target and native language that influences this behavior. The materials consisted of two 3-5 minute long video clips from two documentaries. While students were watching the videos, their eye movements were tracked. The authors analyzed the duration of fixation on on-screen texts. The findings revealed that these low proficiency L2 learners paid attention to captions for 68% of the time, which indicates that they often refer to captions when viewing videos. The researchers also found out that L2 learners of Arabic spend more time on reading captions then L2 learners of Spanish and Russian. L2 learners of Chinese, on the other hand, showed the greatest heterogenity in their use of captions. In addition to proficiency differences, this result is also explained by the fact that "distance between the L1 and L2 affects the way in which learners are able to use captions at a given time in the trajectory of learning" (Winke et al., 2013, p. 268).

To sum up, research achieving positive results with the use of captions demonstrates that because one of the preconditions of acquiring a language is being exposed to large amounts of authentic and comprehensible input (Krashen, 1985), captioned viewing aids learners to understand native speech. Captions allow learners to visualize the aural input and process natural English filled with colloquial expressions, natural pauses and reduced forms (Danan, 2004). Captioned viewing also increases attention and subsequently helps learners develop proficiency in segmenting acoustic messages, recognizing aural forms, and identifying structure-meaning connections (Markham, 1999; Yang & Chang, 2014). In a way, captions serve as an invaluable aid providing learners with the immediate confirmation of ongoing aural streams (Winke et al., 2010). As a result of comprehending what is heard, L2

listeners feel relieved and confident, which might otherwise cause demotivation for L2 listening. On the other hand, studies obtaining no significant difference by means of captions suggest that captioning cannot contribute to the development of listening comprehension due to such reasons as concentration on reading the text rather than listening to the audio, heavy reliance on the text, overloaded working memory, and learner perception of captions as a source of distraction (e.g. Diao et al., 2013; Hui, 2007; Montero-Perez et al., 2013; Zanon, 2006)

In view of all these observations, it can be concluded that although captions are often promoted as a means to aid L2 listeners, all learners do not make equal uses of captions. In other words, captioning benefits language learners with varying degrees (Leveridge & Yang, 2013). As a result, these findings suggest that the focus in this research area should go beyond a naïve search of *whether captioning is effective or not* to a systematic and detailed examination of what factors underlie these contradicting findings in order to move from inconsistency to consistency in this research field. To this end, the following section discusses variables that potentially affect the utility of captions for L2 listening.

Why is Research on Captioning in L2 Listening still Inconclusive?

Existing research on captioning in L2 listening is replete with inconsistent findings. Although most researchers promote captions as an aid to augment L2 listener comprehension (Danan, 2004; Teng, 2017; Yang & Chang, 2014) some have argued that captions do not provide appropriate support to develop L2 listening (e.g. Diao et. al., 2007; Taylor, 2005; Zanon, 2006). There are also others contending that the potency of captioning for improved listening can be compromised, if learners are taught how to take advantage of on-screen texts (e.g. Danan, 2004). One of the ways to increase the effectiveness of captioning as an instructional aid is contingent upon identifying the variables affecting captioning effects. Although, some individual factors (e.g. test difficulty, script differences) are discussed in separate studies, the available literature lacks a comprehensive list of factors influencing the utility of captions for L2 listening. In an effort to fill this gap, we surveyed literature (e.g. Bairstow & Lavaur, 2012; Behroozizad et al., 2015; Bianchi & Ciabattoni, 2008; Chai & Erla, 2008; Hayati & Mohmedi, 2011; Hwang et al., 2019; Latifi et al., 2011; Lee, 2021; Liversidge, 2000; Leveridge & Yang, 2014; Markham, 2001; Markham, 2003; Mayer, Lee & Peebles, 2014; Montero-Perez et al., 2013; Montero-Perez et al., 2014a; Montero-Perez et al. 2014b; Pujadas & Munoz, 2020; Pujola, 2002; Rodgers & Webb, 2011; Stewart & Pertusa, 2004; Taylor, 2005; Teng, 2019; Vanderplank, 2016; Winke et al. 2010; Winke et al. 2013) and distilled research results into a list of characteristics that influence captioning effects. We have generated five main categories with 13 sub-categories: listener-related factors (e.g. proficiency level, background knowledge, cognitive variables and affective variables), material-related factors (e.g. types of captioning, modes of captioning, genre and video difficulty), test-related factors (e.g. test types and test items), task-related factors (e.g. frequency of viewing and task purpose) and language-related factors (e.g. L1-L2 script

differences). We now turn to a discussion of these variables to explain why research on captioned viewing is still inconclusive.

Listener-related factors: Research shows that listener characteristics including proficiency level, cognitive differences, affective variables, and background knowledge have a decisive influence on the effectiveness of captioning in L2 comprehension.

Regarding proficiency level, Vanderplank (2016) states that "the relative effectiveness of captioned viewing varies according to language level" (p.4). In line with this, several researchers (e.g. Montero-Perez et al. 2013; Leveridge & Yang, 2014) suggest that less proficient listeners generally rely on on-screen texts more than higher level learners. While more proficient learners use captions as "a backup to their listening activity" (Pujola, 2002, p. 254), low proficiency levels view it essential for better comprehension. Nevertheless, others indicate that advanced-level learners perceive captions distracting (see Bairstow & Lavaur, 2012) and lower-proficiency learners find it difficult to process three types of stimuli simultaneously (Taylor, 2005).

Cognitive differences such as learning styles and caption reliance are also highlighted as significant variables affecting captioning effects. Hwang et al. (2019) note that active-style learners prefer learning through interaction and experiencing. Reflective-style learners, on the other hand, prefer learning through thinking and observation. Accordingly, while active learning style tends to benefit more from keyword captioning, reflective learning style prefers full-captioned viewing. In a similar line of research, Lee et al. (2021) state that learners' cognitive profiles affect how they utilize from captioned videos. Less-caption-reliant learners have best comprehension outcomes via partial-captioned videos. Whereas, more-caption-reliant learners need more textual support to decode the incoming aural input. These studies suggest that the simultaneous presentation of visual, auditory and textual stimuli increases active-style and less-caption-reliant learners' cognitive load and debilitates their decoding process.

Affective variables are among other factors impacting captioning effects on listening comprehension. Drawing on extant research, Behroozizad et al. (2015) suggest that if learners can confirm what is heard by means of captions, they can feel confident and efficient which may, in turn, lead them to make more strategic uses of captions to improve their comprehension. From a different standpoint, Vanderplank (2016) states that learners respond to different video genres in different ways and furthers that captioning may offer "cognitive counterweight to the affective pull of well-constructed program designed for entertainment and easy viewing" (p.239). Additionally, if students lack motivation or interest in the topic and do not attempt to interpret the listening text, then it is unlikely that captioning can make a difference.

Background knowledge can also influence L2 listeners' caption viewing. Previous knowledge of L2 learners affects their ability to understand the new information. According to Winke et al. (2013) learners with less content familiarity spend more time to read captions.

Similarly, Rodgers and Webb (2011) indicate that learners' background knowledge can compensate for their limited linguistic knowledge and decreases heavy reliance on captions.

Material-related factors: Types of captions, modes of captions, video genre and video difficulty can be included in the material-related factors.

Type of captions refers to the language of captions —L1 or L2— and can have differential effects on listening comprehension. While some studies (e.g. Latifi et al., 2011; Markham, 2001; Pujadas & Munoz, 2020) reveal that L1 captioning results in better comprehension scores, others (e.g. Hayati & Mohmedi, 2011; Stewart & Pertusa, 2004) suggest that L2 captions are more useful than native language captions since they encourage learners to practice L2 listening skills.

Modes of captions primarily point to full captioning and partial captioning. As full captioning allows learners to decode the ongoing streams of speech better, many researchers (Markham, 2013; Montero-Perez et al., 2014b; Teng, 2019) promote the use of full captions for improved comprehension. Several other researchers, on the other hand, support the use of partial captioning in L2 listening since it provides learners with key information and decreases decoding load.

Video genres indicate news, documentaries, series, sitcoms, movies, and so on. Numerous studies (e.g. Mayer, Lee & Peebles, 2014; Vanderplank, 2016) suggest that listeners find captions intrusive for programs which provide easy viewing or place a heavy focus on visuals.

As to video difficulty, it indicates novel content, unfamiliar lexis, speaker speed, reduced forms, and so on. According to Bianchi and Ciabattoni (2008), captions "cannot compensate for an excessively wide gap" (p. 70). Similarly, many researchers (e.g. Hsieh, 2020) contend that video difficulty can significantly predict the utility of captions.

Test-related factors: One of the variables concerned with the influence of testing on the effectiveness of captions is test type. Montero-Perez et al. (2013) state that captioning effect is found largest when comprehension is measured through receptive tests. Contending for an opposite finding, Liversidge (2000) posits that captioning effect on comprehension is found highest if learners are assessed by means of productive tests.

Non-significant or significant results as to captioning effectiveness can also be attributed to test difficulty (Montero Perez et al., 2014b; Pujadas & Munoz, 2020; Teng, 2019). The level of complexity or easiness of the test may lead to inaccurate evaluations with regard to the utility of captioned viewing.

Task-related factors: Frequency of viewing and task purpose have also been highlighted to influence the role of captions in learners' comprehension performance. Several researchers (e.g. Teng, 2019; Winke et al., 2010) suggest that tasks involving repeated captioned viewing lead to better scores in comprehension tests. As to the task purpose, listening activities requiring learners to divide their attention between comprehending the video content and

focusing on language areas (pronunciation, grammar and vocabulary) cause learners to rely on reading captions and neglect the comprehension task, which negatively influences the effectiveness of captions in L2 listening (Chai & Erlam, 2008; Pujadas & Munoz, 2020).

Language-related factors: Ortographic differences between one's native language and the target language impact how learners make use of captions. Research (e.g. Winke et al., 2010; Winke et al., 2013) has shown that when there is a great distance between L1 and L2 scripts, learners tend to process auditory input as initial intake rather than utilizing the on-screen-text.

LIMITATIONS AND RECOMMENDATIONS

These findings reveal that listening with captioned viewing is a rather complicated task influenced by a myriad of factors. The different variables at play demonstrate why research on captioning is still inconclusive although there is a commonsense conviction that captioned viewing leads to better performance in L2 listening. In view of all these inconsistent findings, we suggest that the mere presence of captions does not necessarily lead to improved comprehension. In order to fulfill the potency of captions as a promising tool in L2 listening, practitioners need to design their courses considering these factors and addressing related issues. Moreover, students should be taught how to use captions strategically to improve their L2 listening skills. They should be made aware of cognitive and metacognitive strategies for more active captioned viewing. Practitioners should support this process by incorporating some activities during and after viewing, and making equal uses of both captioned and uncaptioned videos.

Although this study is significant in that it attempts to provide insights into why research on captioning in L2 listening is inconclusive by distilling results of primary research into a list of characteristics that influence captioning effects, some limitations should be noted. First, this narrative literature review drew on a limited number of available studies mostly referring to frequently cited articles and works of leading researchers in the field. While surveying the literature, we might have missed potential studies. Second, despite pooling a variety of factors affecting the utility of captions for L2 listening, the list proposed in the study is inevitably constrained by the findings of studies discussed in this paper. Finally, adopting a meta analysis method or extensive systematic review could have enabled us to draw more rigorous conclusions about the effectiveness of captions in L2 listening and might have yielded a more exhaustive list of variables at work.

CONCLUSION

Based on a survey of primary research on the effectiveness of captioning in L2 listening, this paper aimed to find responses to the following questions: (1) Is captioning really effective in L2 listening?, (2) Does captioning always work for L2 listening?, and (3) Why is research on captioning in L2 listening still inconclusive? While some of the included studies evidenced that captioning can be an invaluable aid for improving L2 listening

comprehension, others have revealed that the sole availability of captions does not warrant success nor does it impede the comprehension process since there are other variables at play. Pooling individual variables discussed in different studies, this paper suggests that the efficiency of captioning in L2 listening can be increased by taking account of learner, material, measurement, task, and L1/L2 characteristics in unique L2 contexts. Of course, the list proposed in the study is not exhaustive and more research is needed to identify other potential variables influencing captioning effectiveness. Further research is also needed to see to what extent addressing these variables can promote the utility of captioning effects for L2 listening comprehension.

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The Relationship Between Middle School Students' Digital Literacy Levels, Social Medıa Usage Purposes and Cyberbullying Threat Level

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Abstract:

The study aims to reveal the relationship between middle school students' digital literacy levels, social media usage purposes, and the frequency of experiencing cyberbullying. A relational model was used in the research. The sample of the study consists of 476 middle school students between the ages of 10-13. "Digital Literacy Scale," "Social Media Usage Purposes Scale," and "Cyberbullying Threat Level Scale" were used to obtain the data. t-test (Mann Whitney U), ANOVA (Kruskal Wallis), and correlation analysis were used in the study. The findings showed that students' digital literacy and the use of social media for interpersonal interaction and lesson preparation were moderate and their witnessing, exhibiting, and exposure to cyberbullying was very low. Finally, there were moderate positive relationships between middle school students' digital literacy levels and social media usage for interpersonal interaction and lesson preparation purposes. In addition, digital literacy had a weak positive relationship with being exposed to and witnessing cyberbullying.

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INTRODUCTION

Various global events such as war, economic crisis, and pandemics have added different dimensions to education. The school closures due to the Covid 19 pandemic have expanded the boundaries of education worldwide by pushing the students to mandatory online learning. As traditional teaching methods were not be used, the administrations of schools and universities chose online courses as an alternative for continuing education (Adnan & Anwar, 2020). This online learning environment had both positive and negative effects on students. Spending time on the internet inevitably enabled students to gain many skills in the electronic environment, i.e., using search engines to access information, sharing files and content over internet sites, using social networks, and solving technical problems (Bilge & Kılcan, 2020). In addition to these gains, students' participation in online activities and their free use of social media might have led to dangerous situations, including cyberbullying (Purnama et al., 2021). Negative experiences raised the question of how aware students were of their digital resilience (Tran et al., 2020).

Glister first used the concept of digital literacy in the late 1990s (Meyers, Erickson & Small, 2013). Digital literacy includes a set of skills for accessing the internet and finding, managing, and organizing digital information; it is "the ability to use and evaluate digital resources, tools and services appropriately and apply this to lifelong learning processes" (Glister, 1997, p. 220). Although different definitions of digital literacy have been developed, it is defined in the simplest sense as "The ability to survive in the digital age" (Eshet, 2004, p. 102). Based on these definitions, "digital literacy" can be expressed as learning essential digital skills to keep up with the digital world. Crucial digital skills include the skills that enable the use of digital tools such as turning the machine on, off, keyboard use, mouse use, touchpad use, right-left click, double click, long press, creating, saving, finding, and editing computer files, and opening, using, and closing various computer applications. Basic digital skills also include having the language and literacy skills necessary to perform tasks in daily life, such as a child emailing the teacher through digital media or an individual completing a job application online (LINCS, 2021). Digital literacy is seen as an extension contributing to traditional literacy, and it is required to work, learn and socialize in the contemporary world (Churchill, Ping, Oakley & Churchill, 2008). The studies on basic digital skills involve digital literacy, information security awareness (Dönmez, 2019; Talan & Aktürk, 2021),

lifelong learning (Özoğlu & Kaya, 2020), digital citizenship (Kaya, 2020), sensitivity to cyberbullying (Kozan & Özbek, 2019), internet addiction (Kul, 2020), leisure attitudes and socialization tactics (Gürtekin, 2019), and information seeking and interpretation strategies in the web environment (Kara, 2021). There were few studies conducted for middle school students. One of them examined digital literacy levels of middle school 5th-grade students according to demographic variables (Pala & Başıbüyük, 2020a). In another study conducted by Pala and Başıbüyük (2021), middle school students' academic success was predicted using their digital literacy levels, self-control, and course motivation.

According to the "Household Information Technologies Usage Survey Report," published by the Turkish Statistical Institute (TSI, 2020), the rate of internet access from home was 88.3% in 2019, while it was 90.7% in 2020. As the internet access rate increases, the use of social media as a communication medium increases, and students face many positive and negative cases (Hançer & Mişe, 2019). This situation also affects students' social media perceptions. Studies have shown that students' attitude towards social media is partially positive (Alican & Saban, 2013). Some students perceived social media as an informative and enlightening medium that provides communication. In contrast, another part of them saw it as a dangerous, harmful and futile occupation (Üztemur & Dinç, 2020). The review of middle school students' social network usage purposes showed that they mostly use social network to communicate with their friends (Eren, 2014; Tuğlu, 2017). Similarly, middle school 7th- and 8th-grade students primarily use the internet to join social networks (Baştürk-Akca et al., 2015). In addition, they found that the internet was an important interaction medium; it had positive aspects in terms of easily accessing information, but there were also negative aspects such as exposure to cyberbullying. With the widespread use of internet access, social media platforms had become a medium where cyberbullying was experienced rather than a place where adolescents have fun among themselves (Baştürk-Akca et al., 2015).

Cyberbullying, which draws more and more attention from educational politicians, is defined as deliberate and repeated harmful behaviours via electronic text (Patchin & Hinduja, 2006). In other words, it includes bullying through technology (Kowalski & Morgan, 2017). Increasing access to new technologies in education can improve students' social interaction and collaborative learning experiences, and it also brings severe

cyberbullying problems in schools with the introduction of electronic communication into classrooms (Erdur-Baker & Kavşut, 2007; Li, 2006, Patchin & Hinduja, 2006; Salı et al., 2015). Cyberbullying, which can be seen in various forms, may occur on websites, blogs, social networking sites such as Facebook, Twitter, Instagram), and messaging programs on smartphones and may negatively affect people's social lives (Gencer, 2017). In a study conducted with 7th-grade students in Canada, approximately 54% of students were victims of traditional bullying, and more than a quarter of them were cyberbullied (Li, 2006). The first cyberbullying research conducted in Turkey examined the cyberbullying and victimization status of 14-19-year-old students (Erdur-Baker & Kavşut, 2007). This study showed that cyberbullying and cyber victimization were experienced in Turkey as in other countries. At the same time, male students do more cyberbullying and were more exposed to cyberbullying than female students.

In the 2010s, the relationship between cyberbullying and many variables such as parental control, digital citizenship, aggression level, internet addiction, gender, and class level was investigated (Akbaba & Eroğlu, 2013; Gencer, 2017, Öztürk, 2019; Peker, 2015; Salı et al., 2015; Yelci, 2018). The study conducted by Öztürk (2019) revealed a significant, positive, and low-level relationship between 8th-grade students' digital citizenship levels and their disposition towards cyberbullying. It concluded that cyberbullying tendencies of the students who spend more time on the internet were high. Özkan (2019) examined the cyberbullying behaviours and cyber victimization of middle school students studying in Konya. He found that cyberbullying and cyber victimization increase as the grade level increases, and male students were more bullies and victims than female students.

Digital literacy studies in the education literature focused mainly on teacher candidates. The only two studies that tried to determine the digital literacy levels of middle school students targeted 5th- grade students. No study covered students of all middle school grades or reveals the differences between age groups. Additionally, there were few studies on the frequency of cyberbullying among middle school students (Özkan, 2019; Yelci, 2018; Gencer, 2017; Salı et al., 2015). There were also no studies that focused on the relationship between digital literacy levels, social media usage purposes, and the frequency of cyberbullying.

Most students displaced due to Covid 19 school closures participated in the online learning process. Due to the fact that children actively use social media platforms in today's technology, the research problem was set as determining the importance of the students' digital literacy in the online learning process. Figure 1 summarizes the research objectives.
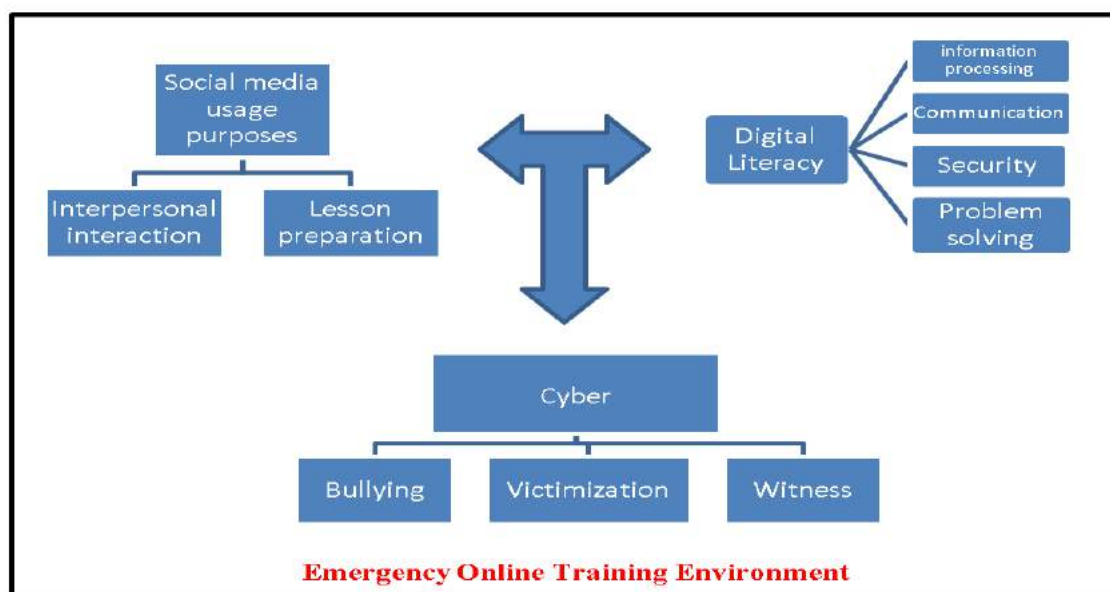
Figure 1. Objectives of the Research Purpose of the Study

Therefore, the purpose of the study is to reveal the relationship between middle school students' digital literacy levels, social media usage purposes, and the frequency of experiencing cyberbullying. Another objective of the study is to determine gender and age effect on these variables.

For this purpose, the following questions were addressed.

1. What are the digital literacy competencies of middle school students? Do middle school students' digital literacy levels differ significantly according to gender and age?

2. What are the social media usage purposes of middle school students? Do middle school students' social media usage purposes differ significantly according to gender and age?

3. What is the level of *witnessing, exhibiting, and exposure to cyberbullying* of middle school students? Does middle school students' cyberbullying threat level differ significantly according to gender and age?

4. Is there a significant relationship between middle school students' digital literacy levels, social media usage purposes, and cyberbullying threat level?

METHOD

Research Model

The identification and analysis of human behaviour in individual and social relationships is a complex process thus, the relational scanning model was chosen in this study because the aim is to determine the relations at a basic level and to make them understandable (Büyüköztürk et al., 2020).

Sample

The population of this research was set as 1030 students studying in a state middle school in the Mediterranean Region in Turkey in the 2020-2021 academic year. The convenience sampling method was preferred in selecting the study group considering the researcher's easy access to collect the data. Data were collected from 511 students who volunteered to participate in the study. The data of 35 participants was eliminated due to insufficient or missing information. The analysis was carried out with 476 participants. Demographic information of the participants is summarized in Table 1.

Table 1

Demographic Information of the Participants

Variables			Frequencies	Percentage
Age	10	Female	82	61.2
		Male	52	38.8
	11	Female	82	57.3
		Male	61	42.7
	12	Female	63	49.2
		Male	65	50.8
	13	Female	35	49.3
		Male	36	50.7
Technological tools		Internet	338	71.0
		Smart phones	286	60.1
		Computer	217	45.6
		Tablet	191	40.1

Preferred purposes of internet usage among participants was for course research with 'obtaining information' coming in at 75.4%. Listening to music (71.4%), playing games

(65.3%), e-schooling (58.0%), and watching movies (56.9%) were also significant preferences. Chatting (48.5%), communication (40.5%), downloading programs (30.9%), reading news (17.9%) and meeting new people (16.2%) were the least preferred activities. In addition to this information, students were using the internet for an average of 2.5 years. They reported spending about three hours on the internet daily, excluding distance education and online course participation.

Data Collection Tools

Personal Information Form

A personal information form was prepared to identify demographic characteristics. The following information was collected: gender, age, mother's education level, father's education level, number of siblings, computer, tablet, smartphone ownership, internet connection status, since when the internet was used, frequency of internet usage, time spent on internet excluding distance education and online course participation.

Digital Literacy Scale (DLS)

The Digital Literacy Scale (DLS) developed by Pala and Başıbüyük (2020b) was used to reveal middle school students' digital literacy levels. This scale has a four-factor structure, and the factors were named as "information-processing," "communication," "security," and "problem-solving." It consisted of 21 items of a 5-point Likert-type ("Always = 5", "Often = 4", "Sometimes = 3", "Rarely = 2" and "Never = 1"). DLS was concluded to be a valid and reliable scale. The reliability coefficients of the sub-dimensions and the overall scale were calculated using the current study's data. Therefore, the reliability coefficient of the subdimensions were as follows: "information processing" .670, "communication" .783, "security" .747, and "problem solving" .793. McDonald omega reliability coefficient was calculated as .899 for the overall scale.

Social Media Usage Purposes Scale

The Social Media Usage Purposes Scale, used in the study, was developed by Eren (2014); it aimed to measure middle and high school students' social media usage purposes in two dimensions: interpersonal interaction and lesson preparation. The first factor was named "interpersonal interaction" because it consisted of items expressing individuals' social media usage for interaction purposes. The second factor was named "lesson preparation" because it contained the items expressing individuals' social media usage for

educational purposes. The scale had 12 items of a 5-point Likert scale (1=Never - 5=Always). The 13th item, in which the frequency of social network usage was determined, was updated by obtaining the permission of the research developer. The scale's reliability for the data collected in the current study was .846 for interpersonal interaction and .813 for lesson preparation dimensions. Accordingly, the reliability of the scale was concluded to be very high.

Cyberbullying Threat Level Scale

The Cyberbullying Threat Level Scale developed by Kalender, Bulu, and Keser (2018) was used to reveal the frequency of cyberbullying among middle school students. The scale, which can be applied to middle and high school students, consisted of three main dimensions: Victimization, Bullying, and Witnessing. There were 17 cyberbullying behaviours in each dimension. The danger level of each behaviour was calculated in three sub-dimensions: the frequency of experiencing the behaviour, the perceived severity level, and the perceived negative impact level. The frequency of experiencing the behaviour was answered as 5 point Likert scale (1=Never to 5=Always). Each item's influence was determined by calculating the sum of the scores obtained from these three sub-dimensions. As reported by the scale development study results, all dimensions of the data collection tool had high reliability and aimed to measure the same behaviour. Only the frequency of being exposed to, witnessing, and exhibiting cyberbullying behaviours were addressed in the study. The reliability coefficients of the current study were found to be .913 for victimization, .924 for cyberbullying, and .948 for witnessing.

Data Collection

Before collecting the data, the scales were applied to six female and six male students to see the possible problems. The timing was adjusted according to the received feedback, and the 6th item of the social media scale was revised. The measurement tools were given face to face to the students, and then all the data were collected and transferred to a secure computer.

Ethical Considerations

Ethical and security concerns were also considered during the study. In the study, all participants were asked to fill the informed consent form, and they were free to withdraw from the study at any time without negatively impacting the student or study. Moreover,

the participants were not subjected to harm. Participants' names were not collected in order to protect their anonymity and keep participants' identities confidential.

Ethical approval document was taken from a "Higher Education Institutions Scientific Research and Publication Ethics Directive."

Ethical review board name: Eskişehir Osmangazi University Ethical Review Board

Date of ethics review decision: 24.06.2021

Ethics assessment document issue number: E-64075176-050.01.01-192973

Data Analysis

SPSS 22.0 program was used in the analysis of the data. Descriptive statistics were given as mean, median, and standard deviation. Kolmogorov Smirnow test results, histogram graphs, and skewness-kurtosis values were checked for normality analyses. Information processing, communication, problem-solving, interpersonal communication, and lesson preparation variables showed normal distribution thus, independent samples t-test was used in their pairwise comparisons and one-way analysis of variance (One Way ANOVA) in group comparison. Mann-Whitney U and Kruskal-Wallis tests were preferred for Victimization, Bullying, Witnessing, and Security, which are not normally distributed. Spearman Correlation Analysis was applied to find the relationship between digital literacy level, social media usage purposes, and cyberbullying frequency. All analyses were done in the 95% confidence interval and $p < .05$.

RESULTS

Results of Digital Literacy Analysis

The average scores of the "information processing" and "security" sub-dimensions were 3.74 (σ: .84) and 4.00 (σ: .88), respectively, implying that participants were close to the "Most of the time" option in these dimensions. These findings show that middle school students can process information and ensure personal security in digital environments. On the other hand, the average scores of "communication" and "problem-solving" sub-dimensions were 3.15 (σ: 1.09) and 3.36 (σ: .97), respectively, implying that participants concentrated on the "Sometimes" option in these dimensions. The students participating in the research stated that they sometimes use their skills to communicate with others in digital

environments and solve technical or non-technical problems. Finally, the average of the overall scores obtained from the Digital Literacy Scale was found to be 75.23 (σ: 16.3).

After getting the descriptive statistics of the data obtained from the Digital Literacy Scale, a difference test was performed for gender. Before starting the different tests, assumptions were checked, and the Levene test results checking the normal distribution of the variables were not statistically significant ($p > .05$), showing that the variances of the groups were homogeneous. Thus, independent samples t-test was used to determine whether information-processing, communication, problem-solving and digital literacy scores differ according to gender (Table 2).

Table 2

Independent Samples t-test Results of Information Processing, Communication, Problem Solving and Digital Literacy Whole Scale

		Gender				
	N	**Female** $\bar{x}$	**Male** $\bar{x}$	**t**	**df**	**p**
Information Processing	476	18.872	18.446	1.103	474	.271
Communication	476	15.626	15.846	-0.438	474	.662
Problem Solving	476	16.183	17.568	-3.122	474	.002*
Digital Literacy Whole	476	75.256	75.199	0.038	474	.970

Note: * $p < .05$, N: sample size, $\bar{X}$: Mean, *df*: degrees of freedom, *p*: significance level

Middle school students' scores from the "problem-solving" sub-dimension of the Digital Literacy Scale differed significantly by gender (t=-3.122, p<.05) (Table 2). In other words, male students participating in the study had more problem-solving skills than female students in the digital world. The effect size of this significant difference was calculated with the eta-square coefficient and found to be .020, which can be interpreted as a small effect (Huck, 2008). On the other hand, there was no significant difference in the overall score according to gender. The data of the security sub-dimension did not show normal distribution, therefore non-parametric Mann-Whitney U test was used. The results

showed that the "security" sub-dimension did not differ significantly according to gender ($p > .05$).

Besides gender, the age of middle school students was thought to affect their digital literacy levels. In this context, ANOVA and Kruskal-Wallis tests were used to determine whether the digital literacy levels of the participants changed as their age increased (Table 3).

Table 3

ANOVA Results of Information Processing, Communication, Problem Solving and Digital Literacy Whole Scale

	Sources	df	Sum of Squares	Mean Sum of Squares	F	p
Information Processing	Within groups	3	522.733	174.244	10.510	.000*
	Between groups	472	7825.230	16.579		
Communication	Within groups	3	1342.587	447.529	16.555	.000*
	Between groups	472	12759.861	27.034		
Problem solving	Within groups	3	470.420	156.807	6.895	.000*
	Between groups	472	10734.855	22.743		
Digital Literacy Whole	Within groups	3	10524.658	3508.219	14.315	.000*
	Between groups	472	115673.403	245.071		

Note. * $p < .05$

Information processing, communication, problem-solving sub-dimensions, and overall digital literacy score show statistically significant differences according to age (Table 3). Tukey HSD test was applied to determine the age group from which this difference originated. As reported by the Tukey HSD test results, the digital literacy proficiency of the

students in the 12-13 age group was higher than 10-11-year-old group. 12-13-year-old students use the search engine and the files they get from the Internet more than other ages. Similarly, students of this age group interact more with people through social network platforms. In addition, 12-13-year-old students consider themselves more successful in solving technical and non-technical problems of digital technologies. The effect sizes of the statistically significant information-processing, communication, problem-solving and overall score differences were .06, .09, .04, and .08, respectively. These results show that the age variable has a small effect on these variables (Huck, 2008).

The results of "security" sub-dimension showed that this sub-dimension differed according to age (Chi-square= 20.20 sd=3, p < .05). As stated in the pairwise difference analysis results, the students in the 12-13 age group got higher scores for "security" than the students in the 10-11 age group. This result show that students pay more attention to safety in digital environments as they get older.

Results of Social Media Usage Purposes Analysis

Descriptive statistics were calculated. Students' average usage score was 2.62 (σ: 1.02) for interpersonal interaction and 3.21 (σ: 1.01) for lesson preparation. These findings show that middle school students "sometimes" use social media for interpersonal interaction and lesson preparation.

After determining students' social media usage purposes, social network platforms preferred by the participants were examined. Students rated various social media platforms between 1 and 5; the most used platform is Youtube, with an average of 3.94. After Youtube, the most used social media applications are Whatsapp ($\bar{X}$: 3.78), Instagram ($\bar{X}$: 2.78) and Tiktok ($\bar{X}$: 2.61). These were followed by Discord ($\bar{X}$: 1.91), Telegram ($\bar{X}$: 1.71), Facebook ($\bar{X}$: 1.56), Twitter ($\bar{X}$: 1.51), Messenger ($\bar{X}$: 1.49), and Skype ($\bar{X}$: 1.26). The other options included Twitch, Snapchat, and Pinterest.

The differentiation of social media usage purposes according to gender was tested. As the required assumptions were met, the data belonging to interpersonal interaction and lesson preparation sub-dimensions were analyzed with independent samples t-test (Table 4).

Table 4

Independent Samples t-test Results of Interaction Between Individuals and Preparation for The Course

		Gender				
	N	Female	Male	*t*	*df*	*p*
Interaction between individuals	476	17.967	18.748	-1.190	474	.235
Preparation for the course	476	16.796	15.838	2.068	474	.039*

Note. * *p* < .05

Only the lesson preparation dimension differed significantly according to gender (*t*: 2.068, *p*<.05)(Table 4). Female students in middle school use social media more for lesson preparation than male students. The effect size calculated by partial eta-square was .009, indicating a very small effect.

A one-way variance analysis (ANOVA) was conducted with age groups and social media usage purposes as a dependent variable. The results are presented in Table 5.

ANOVA was applied to determine whether middle school students' social media usage purposes differ according to age, and the results are presented in Table 5.

Table 5

ANOVA Results of Interaction Between Individuals and Preparation for The Course

Variables	Sources	*df*	Sum of Squares	Mean Sum of Squares	F	*p*
Interaction between individuals	Within groups	3	1951.290	650.430	13.871	.000*
	Between groups	472	22132.741	46.891		
Preparation for the course	Within groups	3	62.503	20.834	.816	.484
	Between groups	472	12006.392	25.437		

Note. * *p* < .05

According to the ANOVA results, age was not effective in middle school students' social media usage for lesson preparation (F(3, 472): .816, $p > .05$) (Table 5). However, middle school students' social media usage for interpersonal interaction differs according to age (F (3, 472): 13.871, $p<.05$). The variances of the groups were homogeneous therefore, the Tukey HSD test, one of the Post-hoc tests, was applied.

Tukey HSD test results indicated 12-13-year-old students differ from other age groups in the interpersonal interaction sub-dimension. Specifically, 12-13-year-old students use social media more for interpersonal interaction than 10-11-year-old students. These results are similar to the findings obtained from Digital Literacy Scale's communication sub-dimension. Partial eta-square was calculated to determine the effect size and found to be .08. This result shows that the effect of the age variable is small (Huck, 2008).

Results of Frequency of Experiencing Cyberbullying Analysis

Central tendency measures and interquartile ranges of witnessing, exhibiting, and exposure sub-dimensions were calculated to determine the frequency of experiencing cyberbullying among middle school students participating in the study.

The lowest score from the sub-dimensions of the cyberbullying frequency scale was 17, and the highest score was 85. The median of witnessing, exposure, and exhibition were 20, 19, and 17, respectively. Interquartile ranges (Q3-Q1) were found to be 11, 7, and 5, respectively. As reported by these results, middle school students' levels of witnessing, exhibiting, and exposure to cyberbullying were between "never" and "rarely." In other words, the frequency of experiencing cyberbullying among middle school students was low. The frequency and percentages of bullying behaviours of students who have experienced cyberbullying at least once were shown in Table 6.

Table 6

Frequency and Percentages of Bullying Behaviours Of Students Who Had Experienced Cyberbullying At Least Once

Bullying Behaviours	Exposed		Exhibiting		Witnessing	
	f	%	f	%	f	%

Giving rude nicknames	148	31.1	89	18.7	178	37.4
Abusing	35	7.4	13	2.7	61	12.8
Moking	153	32.1	91	19.1	192	40.3
Spreading rumors/gossip	114	23.9	76	16.0	157	33.0
Deception	123	25.8	97	20.4	151	31.7
Intimidating	167	35.1	136	28.6	174	36.6
Insulting	126	26.5	86	18.1	145	30.5
Sharing a personal photo or video of someone without permission	38	8.0	37	7.8	71	14.9
Virtual deception (Pretending to be someone else)	70	14.7	59	12.4	102	21.4
Sending unwanted words or photos of a sexual nature	32	6.7	22	4.6	50	10.5
Making a sexual offer	32	6.7	23	4.8	43	9.0
Making calls by hiding the number	59	12.4	51	10.7	90	18.9
Creating an embarrassing or offensive web page (Website, a Facebook page) about someone	35	7.4	30	6.3	53	11.1
Sending malicious email	30	6.3	33	6.9	51	10.7
Kicking someone out of a chat room or a virtual game	134	28.2	115	24.2	145	30.5
Exhibiting hostile behaviors towards someone	96	20.2	87	18.3	124	26.1

| Entering someone else's computer or mobile phone, changing the password without permission | 52 | 10.9 | 32 | 6.7 | | 67 | 14.1 |

The most common events encountered by students who have experienced cyberbullying were intimidating and mocking. These behaviours were followed by giving rude nicknames, kicking someone out of a chat room or a virtual game, insulting, deceiving, and spreading rumours/gossip.

Mann-Whitney U test was used to determine the differentiation in exposure, exhibiting, and witnessing dimensions according to gender (See Table 7).

Table 7

Mann Whitney U Test Results of Victimization, Bullying and Witnessing

Variables	Gender		U	*p*
	Female	Male		
Victimization	226.98	252.60	25017.0	.036*
Bullying	225.15	254.85	24536.0	.012*
Witnessing	238.75	238.19	27967.5	.964

Note. * *p* < .05

Significance test results showed Exposure and Exhibiting sub-dimensions differed according to gender. Male students are more exposed to cyberbullying and exhibit cyberbullying more than female students. The gender had no effect for witnessing sub-dimension (U= 27967.5, *p* > .05). Consequently, female students and male students witnessed cyberbullying at the same level.

The Kruskal-Wallis test was used to determine whether the sub-dimensions of the middle school students' cyberbullying threat level scale differ according to age (Table 8).

Table 8

Kruskal Wallis Test Results of Victimization, Bullying and Witnessing

	Age				Chi-square	df	p
Variables	**10**	**11**	**12**	**13**			
Victimization	223.98	226.11	241.86	284.82	11.591	3	.009*
Bullying	228.04	218.17	246.50	284.77	14.173	3	.003*
Witnessing	211.49	233.44	233.88	308.01	24.763	3	.000*

Note. * *p* < .05

As stated in the Kruskal Wallis test results, witnessing, exhibiting, and exposure levels varied according to age (Table 8). Non-parametric difference tests were performed in pairs (10 and 11, 11 and 12, 10 and 12, 11 and 13, 12 and 13) to see the source of the differentiation. As a result, 13-year-old students differed significantly from other ages in witnessing, exhibiting, and exposure sub-dimensions. In other words, 13-year-old students were more exposed to cyberbullying, witnessed and exhibited cyberbullying more than other age groups.

The Relationship Between Digital Literacy, Social Media Usage Purposes, and Cyberbullying Threat Level

The correlation coefficients between the variables were given in Table 9.

Table 9

Correlation Matrix Between Digital Literacy, Social Media Usage Purposes and Siber Bullying

	1	2	3	4	5	6
1. Digital Literacy	-					
2. Interaction between individuals (SMUP)	.507**	-				
3. Preparation for the course (SMUP)	.309*	.374**	-			

4. Victimization (CB)	.110*	.331**	.027	-	
5. Bullying (CB)	.087	.275**	.015	.756**	-
6. Witnessing (CB)	.171**	.297**	.036	.727**	.696**	-

Note. * *p* <.05, ** *p*< .001, SMKA: Social Media Usage Purposes, CB: Cyber Bullying

Spearman correlation coefficients demonstrated middle school students' digital literacy levels had a moderate and positive relationship with interpersonal interaction and lesson preparation sub-dimensions. According to these results, as middle school students' digital literacy levels increased, their social media usage for interpersonal interaction and lesson preparation increased. In addition, digital literacy showed a weak but positive relationship with exposure to and witnessing cyberbullying —exposure to and witnessing cyberbullying increased slightly as middle school students' digital literacy level increased.

The interpersonal interaction variable, one of the sub-dimensions of the Social Media Usage Purposes Scale, was moderately and positively related to being exposed to cyberbullying. As middle school students' social media usage for interpersonal interaction increased, the frequency of being exposed to cyberbullying also increased. On the other hand, the interpersonal interaction variable was positively but weakly related to exhibiting and witnessing cyberbullying, indicating that the frequency of exhibiting and witnessing cyberbullying increased as social media usage for interpersonal interaction increased. No significant relationship was found between social media usage for lesson preparation and exposure to, exhibiting, and witnessing cyberbullying (p>.05).

On the other hand, the interpersonal interaction variable was positively but weakly related to exhibiting and witnessing cyberbullying variables, showing that the frequency of exhibiting and witnessing cyberbullying also increased as social media usage for interpersonal interaction increased. No significant relationship was found between social media usage for lesson preparation and exposure to, exhibiting, and witnessing cyberbullying (p>.05).

The correlations of cyberbullying threat level scale's sub-dimensions were calcuated and a high and positive relationship was found between exposure, witnessing, and

exhibiting sub-dimensions. Accordingly, as the frequency of exposure to cyberbullying increased, the frequency of witnessing and exhibiting increased, or as the frequency of witnessing cyberbullying increased, the frequency of exhibiting or being exposed to cyberbullying increased.

CONCLUSION, DISCUSSION AND SUGGESTION

In this study, middle school students' digital literacy levels, social media usage purposes, and the cyberbullying threat level were investigated, and the relationship between these variables was analyzed.

First, digital literacy levels were analyzed for various variables. According to the findings of the study, the average of middle school students' digital literacy levels was close to the value found in the study conducted by Pala and Başıbüyük (2020a) with middle school 5th graders. The findings of the two studies support each other, concluding that middle school students were digitally literate individuals. Middle school students' digital literacy skills were tested according to gender. No significant difference was found in the Digital Literacy Scale according to gender. Recent studies in the literature also show that gender did not affect digital literacy (Argelagós & Pifarré, 2017; Liang et al., 2021; Pala & Başıbüyük, 2020a), which supported the findings of the current study. As expected, 12-13-year-old students' digital literacy skills were higher than 10-11-year-old students in all sub-dimensions and overall. Various studies reported that digital literacy increases as students' grades increase (Jin et al., 2020). In addition, this is in line with the increase of young people's technology-based experiences with age.

Secondly, social media usage purposes were analyzed for various variables. Social media has become widespread among children and young people because of its high interaction (Ahn, 2011; Carter, 2013; Lev-on, 2017; Reid & Weigle, 2014; Tartari, 2015; Williams & Ricciardelli, 2014). Facebook, Youtube, Whatsapp, and Instagram were the most preferred social media platforms among students (Dhir & Tsai 2017; Eren, 2014; Tuğlu, 2017; Uyar & Asrak-Hasdemir, 2021). The current study data had also shown that Youtube is the most used platform, followed by Whatsapp, Instagram, and Tiktok. About the usage purposes of these platforms, students "sometimes" preferred to use them for interpersonal interaction and "sometimes" for lesson preparation. The differentiation of social media

preferences can be explained by the change in students' usage purposes as technology and digitalization increase. Before the pandemic, students mainly used social media to have fun and spend their spare time (Gedik & Coşar, 2020; Güney, 2020); on the other hand, after the pandemic, they mostly used it for watching lesson videos, conducting research, and getting information. The difference analysis demostrated that female students use social media for lesson preparation more than males. In the study conducted by Eren (2014), the scores of the girls were higher than the boys in the lesson preparation dimension, but there was no significant difference between the groups. There is no significant differentiation in the interpersonal interaction sub-dimension of social media usage purposes according to gender.

On the other hand, the study conducted by Eren (2014) showed that boys used social media for interaction purposes more than girls. These conflicting results could be explained by the development of the digital world and changing social media platforms. The social media platforms designed in the 2010s were to share daily life, whereas they became an informal learning environment in the 2020s. Regardless of gender, students' social media activities change as they get older. While children got older, their disposition towards meeting new people on social media, sharing with their friends, and staying in touch with people increased. On the other hand, no significant difference was found in the interpersonal interaction dimension according to the age of the students in the study conducted by Eren (2014).

Being exposed to or exhibiting cyberbullying was enhanced with the increase in the use of social media in children (Baştürk, 2020; Güler, 2019). However, witnessing, exhibiting, and being exposed to cyberbullying frequencies were low in the current study. Similarly, a small number of students were cyber victims and cyberbullies in studies conducted in the literature (Ayas & Horzum, 2012; Kowalski & Limber, 2007). The relationship between cyberbullying and being exposed to cyberbullying and gender had been investigated in the literature (Kowalski & Limber, 2007; Ybarra & Mitchell, 2004). The current study results showed no significant difference in witnessing cyberbullying according to gender, whereas male students were more exposed to cyberbullying than female students and exhibited cyberbullying more. In some studies with middle school students, male students were more cyberbullies than females, which supports the findings of the research (Ex: Baştürk-Akca, et

al., 2015; Dilmaç, 2009; Gencer, 2017; Peker, 2015; Özkan, 2019; Öztürk, 2019). Male students had easier access to the internet, prefered more war-based games more in their digital game preferences, and reacted more to negative situations they encounter on the internet than girls, which may have encouraged boys to bully more often than girls (Özkan, 2019). On the other hand, some studies in the literature found that girls were more exposed to cyberbullying than boys (Akbaba & Eroğlu, 2013; Dilmac, 2009; Kowalski & Limber, 2007). Regarding the age groups, 13-year-old students witness more cyberbullying, exhibit more cyberbullying, and are more exposed to cyberbullying than other age groups. In the studies conducted by Özkan (2019) and Gencer (2017), the observation that the level of cyber victimization increases as the grade level increases supports the study. In addition, in the study conducted by Beder and Ergün (2015), the internet awareness of 8th-grade students was lower than 6th-grade students; it was stated that this might be due to the middle school seniors' desire to behave more relaxed and freely. This freedom may also cause students to be more exposed to cyberbullying. In other words, although digital literacy skills increase as the grade level increases, the Internet is not used consciously in higher grades (Gökçearslan & Seferoğlu, 2016).

Finally, the study examined whether there was a relationship between middle school students' digital literacy, purposes of social media usage, and cyberbullying frequency. As stated in the analysis results, there was a moderate positive relationship between middle school students' digital literacy levels and interpersonal interaction and lesson preparation sub-dimensions of social media usage purposes. Besides, digital literacy had a weak positive relationship with being exposed to and witnessing cyberbullying. As middle school students' digital literacy levels increased, being exposed to and witnessing cyberbullying also increased. In the studies, teachers suggested increasing students' digital literacy to protect them from cyberbullying (Wnęk-Gozdek et al., 2019). In this study, the frequency of being exposed to and witnessing cyberbullying of digitally literate students was expected to be low. The presence of a positive relationship, albeit weak, contributed to the literature. Similarly, a study conducted in German schools showed that social media literacy did not affect cyber victimization (Müller et al., 2014). The interpersonal interaction, one of the sub-dimensions of the Social Media Usage Purposes Scale, was moderately positively correlated with exposure to cyberbullying and weakly positively correlated with exhibiting and

witnessing cyberbullying. In particular, people who used social media to chat, shared photos and looked at other people's photos were more exposed to cyberbullying. Studies in the literature demostrated that young people who use social media were more exposed to cyberbullying and become cyberbullies (Uludasdemir & Kucuk, 2019). In particular, Instagram, Twitter, Snapchat, and Tumblr were the social media platforms where young people exhibited and were exposed to most cyberbullying behaviours.

The suggestions submitted in light of the results of this study are presented below.

This study found that the students' digital literacy was at a moderate level. Due to Covid 19, students had to interact more with the digital world; the lessons taught online and the homework given on digital media increased students' digital experiences. Hence, students' awareness of digital and media literacy might be improved by getting help from different disciplines.

With the pandemic, students' internet access mainly occured at home. Therefore, it was necessary to take various precautions in the home environment as in every environment. Young people should be trained about the dangers they may encounter on the internet in the process of advancing from digital literacy to digital citizenship. At this point, parents have important responsibilities. The increase in parents' education level, internet skills, and parental control reduced cyberbullying on students (Akbaba & Eroğlu, 2013). Information security awareness can be created for parents by giving them awareness seminars on cyberbullying risks. Projects promoting conscious internet usage by providing every student with technological tools and easy access to the internet can eliminate inequality among students.

In this study, the students' social media usage for interpersonal interaction and lesson preparation was moderate. Adopting an interdisciplinary educational approach in all courses, especially computer, science and technology, and social studies in schools, may ensure that students acquire the necessary knowledge on digital literacy, social media usage, and cyberbullying. In addition, the relationship of this knowledge with the academic success of the students can be revealed.

From this research, the results of the cyberbullying scale's sub-dimensions showed that witnessing, exhibiting, and exposure levels were low. Coping with cyberbullying can

be researched, and recommendations can be made to allocate the right resources. The most common events experienced by students who have experienced cyberbullying at least once in terms of exposure, witnessing and exhibiting, are intimidation, mocking, giving rude nicknames, kicking someone from a chat room or a virtual game, insulting, deceiving, and spreading rumours/gossip. Advertisement campaigns containing the desired behaviours as public service ads can be organized on the internet to reduce students' cyberbullying tendencies. Besides, to find solutions to such problems also experienced by teachers in online education environments, screening studies can be conducted, frequently experienced behaviours can be revealed, and in-school activities can be carried out with the participation of guidance teachers.

In addition, the psychological and sociological reasons underlying the increase in cyber victimization and witnessing level as students' digital literacy levels increase can be investigated through qualitative studies. In addition, students' digital literacy, social media usage purposes, and the frequency of cyberbullying/being exposed to cyberbullying/witnessing cyberbullying can be examined according to many variables, such as settlement and family income.

Although students' frequency of experiencing cyberbullying was low, social media usage was associated with exhibiting and experiencing cyberbullying behaviours. Although some relationships were found between digital literacy and social media usage purposes and cyberbullying in the current study, there were some limitations. For example, the data on cyberbullying was prepared only according to the participants' statements, suggesting the possibility of manipulation. Although no information that would reveal the participants' identities was collected during the study, it cannot be ensured that the students gave honest answers due to their age. Future studies can further the results of the current study by using experimental or time series models against potential problems. In addition, the relationships between these variables can be reviewed by monitoring students' digital literacy skills and cyberbullying behaviours using digital technologies. In this study, individual factors related to students' digital literacy levels were taken into account. However, different studies should be conducted by considering the variables affected by students' social environment, such as socio-economic level and parents' awareness. Finally, there was no cause-effect relationship in the hypotheses of the current study. Future studies can establish structural

equation models, consider the direction of the relationships between variables and test the hypothesized model's accuracy by applying it to large samples.

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