Journal of Educational Technology & Online Learning
Volume 7 | Issue 1 | 2024
http://dergipark.org.tr/jetol

Educational technology in inclusive classrooms: Assessing teacher awareness and needs

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Suggested citation: Polat, E., Cepdibi Sıbıç, S., Cirit-Işıklıgil, N. C., Hopcan, S. & Baştuğ, Y. E. (2023). Educational technology in inclusive classrooms: Assessing teacher awareness and needs. *Journal of Educational Technology & Online Learning, 7*(1), 115-131.

Highlights

- Based on the opinions of the teachers, it is possible to say that the technological equipment of the schools is not sufficient.
- Teachers have limitations in using technological tools effectively in the classroom environment and in planning technology-assisted instruction for learners with special education needs

Article Info: Research Article

Keywords: *Need analysis, inclusive education, educational technology in special education, technology*

Abstract

The aim of this research is to reveal the awareness of teachers working in inclusion environments and their use of educational technology. Specifically, in this mixed methods study, a needs analysis was conducted to determine the knowledge levels of teachers about inclusive education, their awareness and use of educational technologies, and what kind of support they need. Data were collected through a questionnaire with 133 teachers and focus group discussions with 5 groups of 30 teachers. Based on the analysis of quantitative data using descriptive analysis and qualitative data employing the constant comparison method, the findings showed that teachers' knowledge of special education needs (SEN) students is insufficient and they need support at this point. In addition, the qualitative data analysis unveiled social, academic, and environmental positive outputs of inclusive education alongside the identification of the psychological, academic, and environmental challenges of inclusive education. The findings are expected to benefit the literature, the field of inclusive education, and policymakers.

1. Introduction

The philosophy of inclusive education is increasingly being adopted around the world. Even, one of the most frequently mentioned issues in primary and secondary schools is inclusive education (Batu & Uysal, 2012). However, to put inclusive education into practice, the quality of support and resources to be provided to resolve existing problems is crucial (Woodcock & Woolfson, 2019) and the most critical stakeholders in the realization of inclusive education are classroom teachers. For this reason, the knowledge level, and perspectives of classroom teachers towards Special Educational Need (SEN) learners are estimated to be the determining factors in the success of inclusive education (Batu & Uysal, 2012).

When the studies examining teachers' knowledge level, perspectives, and various other variables towards SEN learners in the national and international literature are considered, it is seen that some studies reveal that the knowledge level of teachers about inclusion is insufficient (Denizli, 2015; Saloviita, 2020). Due to the lack of knowledge, teachers' stress and anxiety levels are higher in inclusive education environments (Gal et al., 2010; Heiman, 2014). Moreover, some studies' findings stand out that teachers consider

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Doi: http://doi.org/10.31681/jetol.1355239
Received 5 Sep 2023; Revised 11 Dec 2023; Accepted 24 Dec 2023
ISSN: 2618-6586.

themselves inadequate in taking on a role in inclusive education (Cooc, 2019; Familia-Garcia, 2001; Westwood & Graham, 2003; Woodcock & Woolfson, 2019; Zanazzi, 2018). Some studies show teachers' attitudes are positive, that they are ready to use assistive technology with their SEN students, and that their self-efficacy is high (Surajudeen et al., 2023; Tsakiridou & Polyzopoulou, 2014). In contrast, other studies have found that teachers have negative attitudes towards SEN students (Sucuoglu et al., 2014). Therefore, it can be said that in the literature there are conflicting findings about teachers' knowledge levels on inclusion and their attitudes towards SEN students.

There are several problems identified in the literature; first, teachers are generally unable to adapt the curriculum in inclusive classrooms (Deniz & Çoban, 2019), and those who stated that they did adapt the curriculum often did so by simplifying the topic or activity, and some of their adaptations consisted of simply enlarging fonts or pictures (Gürgür & Hasanoğlu Yazçayır, 2019). Secondly, besides, teachers benefit from peer support when designing the learning environment (Deniz & Çoban, 2019; Zanazzi, 2018), but have difficulty in designing classroom activities suitable for the level of SEN students (Duran Düşünür, 2018; Nordin, et al., 2023). In addition to these problems encountered in inclusive environments, teachers also mention the inadequacy of physical conditions (Berkant & Atılgan, 2017; Burunsuz & İnce, 2020; Deniz & Çoban, 2019), the time-related problems (Deniz & Çoban, 2019; Duran Düşünür, 2018; Westwood & Graham, 2003; Woodcock & Woolfson, 2019), crowded classroom sizes (Burunsuz & İnce, 2020; Deniz & Çoban, 2019; Gürgür & Hasanoğlu Yazçayır, 2019; Westwood & Graham, 2003; Woodcock & Woolfson, 2019), and the density of the curriculums (Berkant & Atılgan, 2017; Woodcock & Woolfson, 2019). They also state that the presence of more than one mainstreaming student negatively affects inclusive practices (Cooc, 2019) and that SEN students cannot catch up with their peers in terms of academic performance and are exposed to bullying (Burunsuz & İnce, 2020; Duran Düşünür, 2018; Westwood & Graham, 2003). Moreover, teachers reported that there were material deficiencies in inclusive classrooms (Berkant & Atılgan, 2017; Deniz & Çoban, 2019; Gürgür & Hasanoğlu Yazçayır, 2019) and that although teachers were aware of the importance of materials in inclusive classrooms, they were not able to prepare materials for SEN students due to time constraints (Gürgür & Hasanoğlu Yazçayır, 2019).

It is thought that revealing the materials and instructional technologies used by inclusive education teachers who have problems with materials and equipment, determining how much they make use of these technologies, and identifying their attitudes and problems toward inclusion will contribute to the organization of inclusion practices and the accomplishment of the inclusion. Kamalı-Arslantaş and Yalçın (2022) embarked on a project aimed at enhancing teachers' practices in inclusive education. They rolled out a mentoring program grounded in interdisciplinary cooperation, bolstered by school-faculty collaboration. This initiative revealed an uptick in teachers' understanding of basic concepts, educational backing, legal frameworks, assistive technologies, and opportunities for inclusive education. Earlier, Yalcın and Kamalı-Arslantaş (2020) introduced a mentoring program tailored for teachers working with visually impaired children, providing support for material adaptations and challenges in inclusive education. By the program's conclusion, it was evident that mentoring had a marked influence on teachers' professional growth and was instrumental in addressing issues inherent in inclusive education. Mentoring programs hold significant value for teachers navigating inclusive education landscapes. Thus, it's imperative to discern the challenges teachers encounter in such settings, their problem-solving strategies, and their specific needs. Addressing these aspects will bolster the efficiency of support programs, elevate the standard of inclusive education, and ensure equal opportunities for SEN students. Given the pivotal role of educational technology in today's academic world, and its positive impact on student outcomes and motivation (Jaiswal, 2020; Kalay & Arıkan, 2023; Maulana, 2020), promoting its use for SEN students demands a thorough evaluation of teachers' current expertise and perceptions in both inclusive education and educational technologies. However, little is known about how educational technology is used with SEN students, which are also very important in terms of equality and accessibility, which are important concepts for inclusive education (National Center for Education Statistics [NCES], 2019). Studies in the field have predominantly centered on teachers' knowledge, attitudes, and challenges concerning inclusive education. They often restrict the application of educational technologies to merely assistive technologies. Some research focuses

on programs for pre-service teachers, aiming to enhance equality, diversity, and inclusion through the application of educational technologies for SEN students (Starcic, 2010). Others probe into special education teachers' perceptions of these technologies (Mohamed, 2018). In contrast, this study zeroes in on classroom teachers who instruct SEN students, shedding light on their requirements and recommendations concerning inclusive education and educational technology utilization. A meta-analysis indicates a prevalent trend of studies leaning towards gauging the level of schools' inclusive education (Starcic & Bagon, 2014). Furthermore, the incorporation and pedagogical frameworks of educational technologies for diverse student groups have been explored (Heemskerk et al., 2011). This research stands out as it examines teachers' understanding and perceptions of both inclusive education and educational technologies, unveiling their necessities. Training encompassing inclusive education, the integration of instructional technology into inclusive classrooms, and in-service training are paramount. Consequently, this study aspires to capture teachers' viewpoints on inclusive education practices. It aims to pinpoint the salient factors influencing the efficacy of inclusive education at both the school-wide and classroom levels, understand teachers' insights and familiarity with educational technologies, and discern their perspectives, recommendations, and competence in integrating these technologies into inclusive environments. Lastly, it seeks to identify the specific needs teachers have in this domain.

2. Methodology

2.1. *Research Model*

In this mixed methods study, the aim is to reveal classroom teachers' awareness of inclusive education and their use of educational technology. Creswell and Plano Clark (2007) emphasized that mixed methods are useful for leveraging the strengths of both qualitative and quantitative methods and complementing their non-overlapping weaknesses. Since qualitative findings help elaborate on the quantitative findings in this study, the convergent design which is one of the three core mixed methods designs was employed. The research team “collected both quantitative and qualitative data, analyzed them separately, and then compared the results to see if the findings confirmed or disconfirmed each other” (Creswell & Creswell, 2018, p.300). The sample selection method used in the study is purposeful sampling.

For the quantitative part of the study, first, a needs analysis questionnaire was given to 133 teachers from schools in Istanbul at different socio-economic levels to examine the awareness of teachers. For the qualitative part, focus group interviews were conducted with five groups, to analyze the needs of teachers following semi-structured interviews. Krueger and Casey (2000, p.5) define focus groups as a ‘carefully planned series of discussions designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment. To select the participants, purposeful sampling was employed as it allows in-depth research by selecting information-rich situations depending on the purpose of the study. In the current study, each focus group consisted of four to seven teachers working in five different schools (5 groups, 30 teachers in total). The students in these schools came from various socio-economic levels (SES) (low, middle, and high socioeconomic levels), which was aimed to illustrate teachers’ needs comprehensively.

2.2. *Data Collecting Tools*

The quantitative data were collected via the instruments including a demographic form, and a need analysis survey to get the quantitative data, and the qualitative data were obtained through subsequent focus group interviews for the qualitative data.

The demographic form was developed by the researchers. The form contains six close-ended questions to get participants’ gender, school, age, year of experience, and education level.

A need analysis survey developed by Göktaş (2006) and Taş (2011) was adapted and used in line with the research questions. The original need analysis survey was modified by choosing and incorporating questions tailored to the study's aim of exploring teachers' knowledge of inclusive education and their application of educational technology. The original survey consisted of 52 items. Cronbach's Alpha was

calculated as .92 while Cronbach's Alpha Based on Standardized Items was calculated as .94, which is acceptable. In line with the purpose of the research, a total of 23 questions (open-ended, Likert type, multiple choice, and multi-choice questions) were included in the survey. Questions that were not suitable for the purpose of the research were eliminated by the researchers. In this way, a total of 23 questions were selected. It consists of questions about the hardware and software dimension for the use of Information Technologies (IT), the purpose of IT use, levels of technological competencies, integration of technology, challenges for IT integrations, the training teachers want and need to take, and awareness of inclusion.

A semi-structured interview form was prepared for focus group interviews. The interview form consists of 11 questions in total. Both the survey questions and the interview questions were presented to two special education experts, and two educational technology experts, and their opinions were obtained in terms of clarity and scope. Piloting these instruments was conducted with three teachers. The survey questions were found appropriate, while revisions were requested regarding the interview questions. Necessary revisions were made by the researchers.

2.3. *Sampling or Study Group*

Kağıthane, one of the districts with the highest number of inclusive students determined by a written request from the Ministry of National Education, has been selected. The participants consist of classroom teachers from five primary schools in Istanbul Kağıthane District with different socioeconomic levels. Schools were from low, middle, and high socio-economic levels. A total of 133 classroom teachers in five schools responded to the questionnaire. 77.4% of 133 teachers are women; 22.6% of them are men. Almost half of the teachers (39.8%) are between the ages of 35-44. While almost all of the teachers (94.7%) have a bachelor's degree, only 5.3% have a master's degree. Half of the teachers have 16 years or more of experience. More than half of the teachers have at least one inclusive student in their class (Table 1).

Table 1.
Classroom Teachers' Characteristics (N=133)

Gender	**n**	**%**
Female	103	77.4
Male	30	22.6
Age		
18-24	4	3.0
25-34	39	29.3
35-44	53	39.8
45-54	35	26.3
>=55	2	1.5
Degree		
Bachelor	126	94.7
Master	7	5.3
Experience (year)		
0-5	24	18.0
6-10	17	12.8
11-15	25	18.8
16-20	27	20.3
>=21	40	30.1
Teachers with Inclusive Students		
Yes	81	60.9
No	52	39.1

2.4. *Data Analysis*

To analyze the quantitative data obtained from the questionnaire, descriptive analysis (frequency and percentage) was conducted. The qualitative data which was collected via focus group interviews was first

transcribed and then analyzed via the constant comparison method (Glaser & Strauss, 1967). The codes were specified after repetitively reading the transcripts and annotating. As the codes started to emerge, through constantly comparing the frequently occurring codes, the categories and themes were generated. Moreover, to confirm the intercoder reliability, two independent coders coded 20% of the data sample according to a coding scheme (Cohen's kappa= 0.76).

2.5. *Research Procedures*

Classroom teachers from five schools were informed about the purpose of the study and volunteering. Teachers were first asked to fill out the online questionnaire. After the questionnaires were submitted by the participants, focus group interviews were completed with four to seven teachers in each focus group voluntarily from five schools with low, medium, and high socio-economic levels.

3. Results

In this section, we address the findings of the questionnaire and those of the focus group interviews. Since this study's main aims are twofold, that is revealing the participants' awareness and needs both toward inclusive education and technology use, the findings are presented under two main headlines: (1) Awareness and needs of participants towards inclusive education, (2) awareness and needs of participants towards technology use.

3.1. Awareness and Needs of Participants Towards Inclusive Education

An analysis of the questionnaire showed that most of the participants (63.3%) did not familiarize themselves regularly with the updates in the inclusive education field and more than half of the participants (59.4%) found their knowledge in the field insufficient.

When the interview questions asked to reveal the awareness and needs of the participants were analyzed, four key themes were revealed: The positive outputs of inclusive education, challenges of inclusive education, teacher competencies, and suggestions on inclusive education. The categories and codes found during the analysis were shared under these four themes in this section.

3.1.2. The Positive Outputs of Inclusive Education

In the questionnaire, when the participants were asked what sort of positive outputs the teachers observe in inclusive education, 'peer-assisted learning (n=55, 41.3%)', 'cooperation among the teachers (n=31, 23.3%)' and 'acceleration of being part of the society (n=43, 32.3%)' were the most frequently reported positive outputs. During the analysis of the interviews, as can be seen in Figure 1, under the theme of 'the positive outputs of inclusive education', three categories such as social, environmental, and academic outputs emerged. The codes related to each category were also displayed by attaching them to each category in Figure 1. The prominent and the most frequent codes mentioned by the participants were reported along with representative quotations from the data.

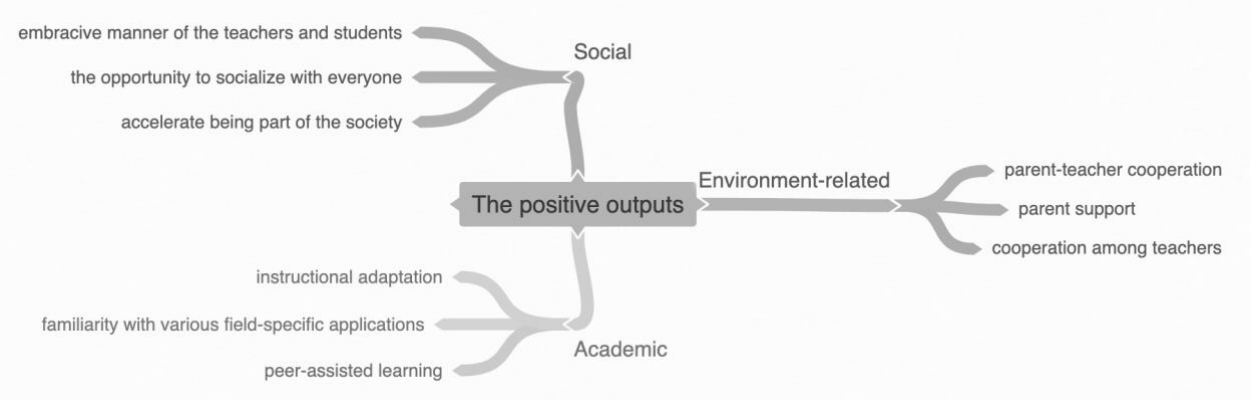

Fig. 1. Categories and Codes of the Positive Outputs of Inclusive Education

Among the social outputs of inclusive education, the participants frequently mentioned that inclusive education allows the SEN students to be with the non-SEN students which expedites the process of socializing and being part of the society, they live in, which is one of the foremost aims of inclusive education. As academic outputs, the participants indicated that they realize the importance of getting to know the various field-specific applications that support SEN students' academic growth. Besides, most of the participants mentioned that they see the potential of peer-assisted learning and instructional adaptation, that is knowing which method to adopt through suitable collaboration, as the following quotation illustrates:

"For example, there were autistic students in my previous class. When we first started literacy education, the boy (one autistic student) learned the letter E. And when he learned the letter, everything turned into a mess. He couldn't get it, he couldn't learn. Then I took my student to the support class. I met with my friends who had a rehabilitation center there, and after talking to them, I changed the sound system and applied a different method by teaching the vowels first. The boy had very good painting skills. Using this, I taught him sounds by painting. Afterward, he combined the plosives with the vowels I taught, and within a month, he learned how to read and write."

Teachers also recognized the environment-related positive outputs of inclusive education as worthwhile. Most of the participants mentioned that the collaboration among teachers helped them a lot especially when they had SEN students in their classes. Besides, the participants expressed that the parent's interest in their children's education could be a game changer for the success of inclusive education, as one of the teachers exemplifies:

"The family of my other autistic student is incredibly concerned. Even the doctors must follow the process with astonishment. The doctors invited them to the committee and said a miracle happened. The student got to a point close enough to not being autistic anymore. This happened with parent support. Of course, we (teachers) also contribute to the students' progress but it's a miracle in this field and it's the parents who achieved it."

3.1.3. The Challenges of Inclusive Education

In the questionnaire, when the participants were asked what sort of prominent challenges add up to the failures in inclusive education, 'the lack of responsible personnel' (teachers, experts, counselors, etc.) and 'the teachers' knowledge deficiency in the inclusive education field' were the two frequently reported challenges. In addition, the negative attitudes of the teachers, the inadequacy of school counseling services, incapacities of physical environments, and insufficiencies of educational technology use were the mentioned challenges (see Table 2 below).

Table 2.

Prominent Challenges Adding Up to The Failures in Inclusive Education

Challenges	**F**	**%**
Negative attitudes of the teachers	32	24.1
Lack of responsible personnel (teachers, experts, counselors etc.)	37	27.8
Inadequacy of school counseling services	11	8.3
Teachers' knowledge deficiency in the inclusive education field	37	27.8
Insufficiencies of educational technology use	2	1.5
Incapacities of physical environments	11	8.3
Other	3	2.3
Total	**133**	**100**

In the interviews, in terms of the challenges of inclusive education, three main categories emerged: psychological, academic, and opportunity-related/environmental challenges. These corroborate with the findings of the questionnaire even though much in-depth data was obtained and additional codes were

revealed in the interviews. Figure 2 shows the most frequent codes highlighted by the participants related to these three categories.

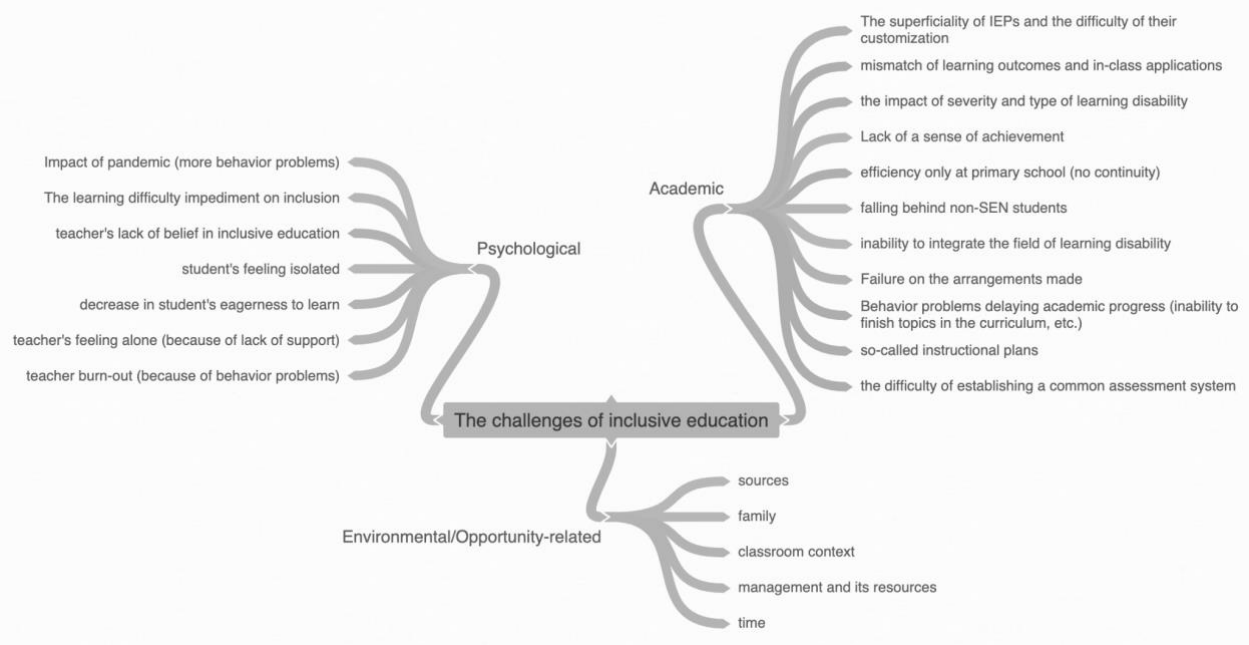

Fig. 2. Categories and Codes of the Challenges of Inclusive Education

Teachers reported during the interviews that there are many psychological challenges to inclusive education. Most of the teachers indicated that the SEN students feel isolated even though they made an effort to include SEN students in and out of class activities. Teachers mentioned that when they need to assign different materials to SEN students, non-SEN students keep asking questions such as 'What are they (SEN students) doing?', and 'Why are they working on something different?', which in turn underlines the fact that they are different. In addition, another code uncovered during the analysis is about how the non-SEN students feel less willing to learn and how their learning disability impedes their inclusion. For instance, they cannot join the listening activities as they have a hearing impairment. Besides, it was mentioned that both the non-SEN students and SEN students show more behavior problems because of the impacts of the pandemic. To portray what sort of behavior problems they are dealing with in the inclusive classrooms, a teacher's example is given below:

"We had a lot of behavioral problems so now you are going to teach literacy in a classroom and you have to start teaching from scratch. I'm always on the board with that kid (SEN student) as I tied him with a rope to my hand because you can't let go, it's not possible to let go. He pulls someone's hair the moment you let go or picks up someone's pen without permission."

Five main codes under the category of environmental/opportunity-related challenges were revealed: challenges caused by family, management and its resources, classroom context, sources, and time. Almost every interviewee highlighted the impact of the family on the SEN students' education. Teachers often feel frustrated if the family is not collaborative and is indifferent to their children's education. They said it is even more difficult when the parents do not accept that their children need special education. Besides, some parents do not have the adequate educational background to support their children at home, which again leaves all the burden on teachers' shoulders. Another family-related challenge is sometimes caused by the household's socioeconomic status resulting in students' malnutrition. Plus, both parents have to work long hours and they do not get to spend quality time with their children.

The respondents also mentioned challenges caused by classroom context such as the classroom being overcrowded and the sociocultural diversity of the students. Almost all the teachers mentioned that they have very crowded mainstream classes and the number of SEN students in each class is mostly more than

it is stated in the educational regulations. In terms of the challenge caused by sociocultural diversity, teachers noted that it is hard to focus their attention on SEN students in classes where students do not even share a mother tongue as some are coming from Syria and other cultures.

Another significant code was related to the challenges caused by the sources. Teachers especially highlighted many times that they lack sources/materials (both for in-class activities and assessment) which were designed according to each learning difficulty type and they are not designed considering the real classroom contexts in our country. One teacher commented:

"The fact that the materials designed for SEN students are not originally intended for inclusive classes of 30 students but for one-to-one tutoring sessions creates problems for us."

Last but not least, another frequent code is related to how time could be a challenge when the lesson periods are 40 minutes long and that time span is almost never enough to realize the lesson's learning outcomes for both SEN and non-SEN students within the same period.

3.1.4. Teacher Competencies

Another theme that emerged in the analysis is about the teacher competencies which were revealed with their positive and negative sides in the data. For both the positive and negative sides of teacher competencies, the codes were reported under the categories of the theoretical level and practical level (see Figure 3 below).

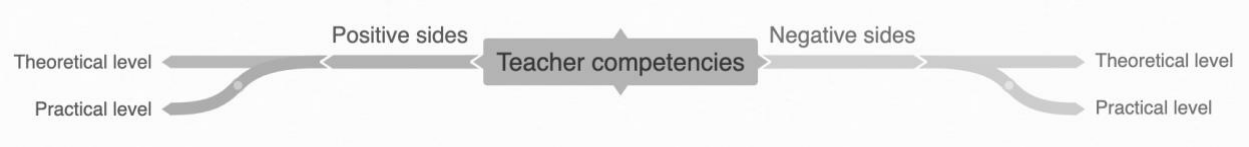

Fig. 3. Categories and Codes of the Challenges of Inclusive Education

First of all, the teacher competencies with their negative sides will be reported. At the theoretical level, teachers recognized the insufficient instruction in the inclusive education field as a factor affecting how competent they feel as a teacher. They indicated that the number of courses they took as an undergraduate was not adequate and mostly the courses were taught perfunctorily. Furthermore, they acknowledged that the in-service training was not enough to improve their professional qualifications. One prominent issue mentioned was about how the teachers could not get the opportunity to do their internship at the inclusive classes or work with those children right after they graduated. According to some of the teachers, it would have given them a chance to reinforce what they had learned during the undergraduate courses. One respondent highlighted this situation:

"Even though in-service training aims to learn the in-class applications, our training does not turn into practice; therefore, the license we got 20 years ago does not allow us to drive after 20 years. That's a problem."

It was revealed in the analysis that the codes about the negative sides under the teacher competencies theme outnumbered the positive sides. Still, few prominent codes frequently came up in the data and were worth mentioning at both theoretical and practical levels. First, according to the respondents, when the teacher is competent and has up-to-date knowledge in the inclusive education field, the atmosphere of the classroom is affected positively. About this, the teachers indicated that if the teacher knows how to discover their students' talents and lead them toward the areas they are more talented in, the results bring out more success.

On the practical level, teachers mostly indicated that the collaboration between teachers and other parties is directly related to the success of the SEN students. For instance, a teacher highlighted that when the teacher of the SEN students works closely with the school counselor, the necessary steps can be taken on time and the SEN student could be guided properly.

3.1.5. Suggestions on Inclusive Education

The suggestions made by the respondents were mostly related to environment, materials, teacher, and family. About the environment, in the interviews, almost every participant suggested that the inclusive classrooms need to be less populated, that is, with a maximum of 20 students as also confirmed in the questionnaires that 97% of the participants think the classroom size is an influential factor in the efficiency and fruitfulness of the education in inclusive classrooms. In addition to that, the respondents highlighted that SEN students who have the same type of learning difficulty should be in the same inclusive class. For that, the teachers think that first of all, SEN students should be diagnosed earlier, that is during kindergarten to prevent the delay of their academic progress and to place them in a suitable inclusive classroom. Also, they mentioned that there should be more than one SEN student in each inclusive class so that the SEN students do not feel alone. According to the participants, apart from the in-class time, the teacher should be allowed to spend one-on-one time with SEN students. This is also in line with the very frequent suggestion that SEN students should get extra help at support classes regularly on certain days of the week to catch up on their studies at the inclusive classes. Another alternative to this suggestion during the interviews was for the SEN students to spend a few hours a day at the inclusive classes while they spend the rest of their time at the support classes painting, playing, and working on the topics they've learned in class.

In terms of the materials, the teachers expressed their need for the materials that could be used by the SEN students both for self-studying and also with the teacher's guidance. Most participants believed that the materials should be designed according to the objectives in the curriculum and they should be tangible, visual, colorful, and if possible three-dimensional. The teachers also stated that they could only have black and white worksheets which are not enough to get the attention of the students.

3.2. Awareness and Needs of Participants Towards Technology Use

To reveal the awareness and needs of the participants' technology use, the teachers were asked in the questionnaire to what extent they use technology and it was revealed in the data that most of the teachers use computers (76.7%) and the Internet (82%) all the time. Moreover, they also use 'from time to time' to 'all the time' projector (73.7%), smart board (54.1%), educational software (45.8%), and scanner (40.6%). Among the educational software they use for their classes, word processors, e-spreadsheets, presentation programs, web browsers, emails, instant messages, online classrooms, videoconferencing, educational games, teaching software, mobile apps, operating systems, and referencing software were the most frequent. It was seen that 57.9% of the teachers owned a computer and a mobile phone. Also, it came out that almost half of the schools (47.4%) do not have computer labs. When the participants were asked how they felt about several technological competencies, almost all the participants stated that they either felt 'completely competent' or 'somewhat competent'.

3.2.1. Technological Competencies

Corroborating with the findings of the questionnaire, the participants mentioned that they can make use of computers, projectors, and smart boards. In addition, they indicated that they can also use printers, multimodal materials such as videos, three-dimensional materials, and Web 2.0 tools. They added that they mostly use web 2.0 tools as these tools are visual, and auditory and include games. Also, they highlighted that they not only use web 2.0 tools for in-class activities but also assessment.

However, they still mentioned that everything is all up to teachers' effort, that is whether or not the teachers themselves are interested in technology and make a special effort to improve their technological skills. Confirming this statement, they mentioned that their knowledge of technology is outdated and they do not know the latest developments in technology that can be used for inclusive classrooms. They added that the content of the courses they took during their undergraduate studies does not address today's needs, as the following response illustrates:

"We were doing something like this, there were acetates, and we were writing on acetate sheets with technical pens. It was the most technological thing. There was an overhead projector, I remember them. That was what we understood from technology at that time, I'm sorry."

3.2.2. Technological Deficiencies

The data revealed that most of the teachers think the technology cannot be effectively used in crowded classrooms. They said that it is hard to monitor the students' progress and be sure that they are completing the activity assigned to them. They also highlighted that the technological materials are not designed specifically for the SEN students and they could not be customized for a specific SEN student. Even if there are customizable materials designed for SEN students, the teachers said during the interviews that it might not be possible to use them as the schools are not equipped with the latest technology such as sustainable support rooms as also confirmed by the data in the questionnaire with 31.6% of the participants' complete agreement and 37.6% of the participants' agreement. 69% of the participants also agreed with the statement in the questionnaire that the existing equipment could not run the updated applications and software. More than half of the participants (53.4%) also expressed that there is no sufficient physical environment in the school to use the instructional technologies. Besides, they said that not all the students have their technological materials.

In addition, the participants stated that the technology cannot be used effectively for distance learning as some students in the class have different mother tongues and the same material prepared in Turkish cannot be used from a distance without teacher guidance.

3.2.3. Awareness Towards Technology's Importance

It was seen that almost all the participants are aware of how important it is to use technology for educational purposes. 97% of the participants indicated that they make use of instructional technologies while teaching. They believe that technology motivates the students, increases attention span, provides an additional environment for the students' voice to be heard, improves students' self-confidence, includes both visual and auditory elements, reveals individual differences, and makes teachers' job easy to address various learning styles. A teacher reported:

"For example, the visual memory of an inclusion student might be powerful. The child cannot understand only when there is a traditional lecture, but when you open something visual, it is directly engraved on their memory."

As mentioned by the participants, today's children are already very interested in and inclined to use technology. Therefore, it takes their attention very easily and it allows teachers to gamify their classrooms and use digital games for teaching purposes. Moreover, they believe technology makes teaching more practical and even the students who have been absent in class can follow what has been done in class via online platforms. Specific to the smart board, the participants stated that it keeps students active in class as the following response exemplifies:

"Before we came here, we did an activity, it was drag and drop. A student said, "Teacher, it is so fun!" and I said "Okay, from now on you will always do it". They said, "Yay!". You know, I am the one who normally fills in the blanks there but they liked it so much. Technology is very important in this sense as I can get them to do it with technology."

4. Discussions and Implications

In the study, the first aim was to determine the awareness and knowledge levels of the teachers involved in inclusive education. It was seen in the findings that most of the teachers stated they considered their knowledge level insufficient in terms of inclusive education. This finding is in parallel with the existing studies in the literature (Acarlar et al., 2003; Batmaz & Çermik, 2019; Cooc; 2019; Familia-Garcia, 2001; Kamalı-Arslantaş & Kocaöz, 2023; Kamalı Arslantaş & Yalçın, 2023; Kocaoğlu et al., 2023; Taş, 2021; Zanazzi, 2018; Westwood & Graham, 2003; Woodcock & Woolfson, 2019). When the literature is

examined, it is emphasized that teachers' level of knowledge about individuals with SEN and inclusive education is an important factor in creating effective learning environments (Metin, 2018). Heiman (2014) found that teachers' insufficient knowledge of inclusive education increases their anxiety levels towards the teaching process. It can be said that it might be difficult to provide quality education in an environment where anxiety and stress levels are high. However, studies in the literature show that the teachers do not find the in-service training functional as they were not practical, which are in fact organized to support the teachers and help them gain knowledge in the area (Demir & Usta, 2019).

The participants of the current study stated that the implementation of inclusive education practices would have positive outcomes for both SEN and non-SEN individuals. This finding corroborates with the previous studies (Çetin, 2020; Duran Düşünür, 2018; Tsakiridou & Polyzopoulou, 2014). On the other hand, teachers think that the difficulties they experience in inclusive education hinder a quality education process. The difficulties that teachers frequently emphasize are listed as overcrowded class sizes, inadequacy of materials and personnel, and not providing enough professional development support to the teachers. When these difficulties are analyzed in order, it is seen that the overcrowded class and the difficulties experienced by teachers in the planning and implementation of classroom activities come to the forefront. In Turkey, the Regulation on Special Education Services determines the procedures and principles for the organization of inclusive education environments and includes class sizes within its scope. However, in some cases, it is seen that there are students above the limit determined by the relevant regulation (Batmaz & Çermik, 2019). The teachers who participated in the study characterized the overcrowded classes as one of the obstacles to including children with SEN in the most effective way in the activities. Another difficulty mentioned by teachers was the insufficiency of educational materials in their classrooms. Considering the difficulties experienced by children with SEN in the learning process and the importance of material support, it can be said that these difficulties will significantly affect the learning process. Tekin and Tortamış-Özkaya (2012) emphasize that material support is very important for children to learn new concepts and experiences. Therefore, it is possible to say that the lack of materials in classrooms is an important deficiency in classroom learning and creating an effective learning environment. Finally, the teachers participating in the research stated that they did not have sufficient knowledge in the field of special education and that they were inadequate in receiving professional support. When the literature is examined, the field knowledge of teachers working in inclusive learning environments is expressed as one of the most important points in preparing and implementing Individualized Education Programs (IEPs) for children with special needs (Küçüker et al., 2002). Besides, the existing studies revealed that the SEN students could not catch up with their non-SEN peers in the inclusive classrooms in terms of academic performance and were exposed to bullying (Burunsuz & İnce, 2020; Duran Düşünür, 2018; Westwood & Graham, 2003). Therefore, it is possible to say that the difficulties experienced in inclusion practices are not only teacher or student-related but also related to the inadequacy of the support services and the physical conditions.

Another aim of the study is to determine teachers' awareness related to technology use. Revealing the technology awareness of teachers will contribute to illuminating the subject, which has very limited literature in terms of the use of educational technology with SEN students (NCES, 2019). According to the findings obtained, it is possible to say that many teachers have access to at least one of the technology tools. As Nordin et al. (2023) stated the participants in this study also felt limited in the use of technological tools for educational purposes. When the studies in the literature exploring the perspectives of the SEN students' teachers and their technology use were examined, it was seen that teachers have a positive perspective toward technology use, but their technology use can vary according to the type of course (Aslan, 2018). In particular, the use of multimedia materials for literacy skills increases the SEN students' interest and contributes significantly to the acquisition of literacy skills (Şahin & Çakır, 2018). Besides, it was found that the use of technology in teaching increases student motivation and ensures retention of learning (KamalıArslantaş et al., 2021; Sakallı Demirok et al., 2019; Sökmen et al., 2019). In addition, the positive contribution of educational mobile applications to SEN students has been revealed in research (Gül et al., 2018; Hopcan & Tokel, 2021; Polat et al., 2019). As the findings of the existing studies corroborate with those of the current study, it is possible to say that technology use can be an important factor in increasing the quality of education in inclusion environments. Surajudeen et al. (2023), in contrast to his study, which

showed that SEN students were ready to use assistive technology and had high self-efficacy, the present study revealed that teachers needed support for the effective use of technology in educational settings. Moreover, it is stated in the literature that teachers use technology in inclusive classrooms and that integrating technology into lessons makes lessons more enjoyable and results in positive feedback from students and parents (Akın, 2016). Moreover, statements that visuals and technology accelerate SEN students' learning took place in some studies and it is also found that teachers use technology to plan lessons and embody the learning process for SEN students (Sökmen et al., 2019). As the findings of the existing studies corroborate with those of the current study, it is possible to say that technology use can be an important factor in increasing the quality of education in inclusion environments. In the current study, it was found that teachers need support for the effective use of technology in educational environments. The findings, however, showed that almost half of the pilot schools do not have computer laboratories and therefore it can be said that the schools need to be equipped with technology. In the study by Abulibdeh et al. (2020), teachers emphasized the importance of technological materials to fulfill the requirements of the curriculum effectively and to increase the academic performance of SEN students in inclusive classrooms. In the current study, the participants indicated that as they had to carry all the responsibility on their shoulders not just to plan their teaching but also to select the appropriate technological materials for their classrooms and design them, they got exhausted in the inclusion classes. Therefore, the findings obtained in the current study are also in line with the results of the studies in the literature, and it is possible to say that there is a need for expert and additional personnel support in inclusion classes.

5. Conclusion

This study revealed that there are some prominent requirements to increase the quality of inclusive education environments. The first of these is that teachers' knowledge related to the SEN students is insufficient and they need support at this point. It can be suggested that in-service training providing hands-on, field-related experiences should be planned to increase the quality of inclusive education. The second is that the classroom sizes are crowded and teachers have problems in designing an effective learning environment both with SEN and non-SEN learners. At this point, it can be suggested that personnel support should be provided and class sizes should be reduced to overcome the difficulties experienced. Third, teachers have limitations in using technological tools and equipment effectively in the classroom environment and planning technology-assisted instruction for SEN learners. With that being said, it is possible to conclude that the technological equipment of the schools is not sufficient. To remedy that and to ensure the effective and efficient use of technology in inclusion environments, it is recommended that expert support should be provided to teachers when integrating technological tools into the curriculum. Finally, it has been found that teachers experience limitations in adapting the curriculum and learning outcomes for SEN learners in inclusion environments. To prevent these difficulties experienced by teachers, it is thought that it will be beneficial for teachers to be in cooperation with families of SEN students, school counseling services, field experts, and other service providers.

6. Limitations and Suggestions

One of the limitations of this study is that the study was limited to the province of Istanbul and was conducted with a limited number of participants. To obtain more comprehensive and generalizable data, it is recommended that the research be conducted in different socio-economic and geographical regions and that the data obtained be re-evaluated. Another limitation of the study is that the data collection process was carried out with data collection tools based on teacher opinions. To examine the findings obtained in-depth and to support the reliability of the research results, it is recommended to collect data with different data collection techniques (e.g. observation, etc.) and evaluate all findings together.

7. Funding

This study was supported by the European Union Increasing the Quality of Special Education Services for Inclusive Education Grant Scheme (Project Number: TREESP2.1.IQSES/P-03/032) and also supported by

the Scientific Research Project Coordination Unit of Istanbul University-Cerrahpasa (Project number: SDP-2022-36920). The descriptive data in the paper are included in the EU project report partially.

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