Predictors of The Subjective Effectiveness of Emergency Remote Teaching During The First Phase of The COVID-19 Pandemic

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Abstract

Worldwide school closures which were happening during the first phase of the COVID-19 pandemic in spring 2020 created a great lesson about the conditions for effective teaching. As temporary school closures seem very likely to occur in the forthcoming school year(s), at least locally, it is worthwhile to exploit this lesson to learn more about the capacities and resources that can be utilised in both emergency remote teaching (ERT) and regular teaching, beyond the pandemic.

This research was initiated in the third week of ERT, on 13 April 2020, and involved 154 teachers in 87 schools in Poland. Its purpose was to identify predictors of subjective effectiveness of emergency remote teaching (SEERT) that might be important for remote teaching pedagogy in general. The results show that the best predictors of the SEERT are self-efficacy, digital competence and peer support from other teachers. The situation of the pandemic in a sense confirms the key role of transferable resources in the performance of teachers' professional duties and sets a path for strengthening these in teacher training and continuing professional development programmes to increase capacity for both regular and remote teaching.

Keywords:
Emergency Remote Teaching (ERT), COVID-19, Teachers' Subjective Effectiveness, Peer Teachers' Support, General Self-Efficacy, Digital Competence

Introduction

Education during the pandemic

On 11 March 2020, the World Health Organisation declared a state of worldwide pandemic of the disease COVID-19, which was caused by the severe acute respiratory syndrome coronavirus (SARS-CoV-2). As of late July 2020, the virus was present in every single country in the world and the number of cases exceeded 14 million. The pandemic was connected with extensive school closures which started in February 2020, and were in force in various forms for months to come.

Teachers demonstrated remarkable resilience, flexibility and commitment to education during the pandemic. Thousands of them immediately started their adventure with emote education, which is usually described as 'a formal learning activity conducted when teachers and students are separated by (geographical or temporal) remote and supported by communication technologies – TV, computers, e-mail' (Appana, 2008, p. 5) and/or online learning, meaning education based on the internet as the main means of delivering information and communication. However, according to Hodges et al. (2020) this type of sudden change from bricks-and-mortar to distance teaching should instead be called emergency remote teaching (ERT). The pandemic revealed that teachers' familiarity with integrating technology into instructional practice was still limited and they had various levels of readiness to engage in online teaching and even in professional development using technology. The OECD study from March and May 2020 (Reimers & Schleicher, 2020) suggests that teachers are convinced that the effectiveness of remote education might be poor: almost half of the respondents indicated that it is not possible to assess the effectiveness of remote education, and 32% said that students learned less than they would have normally learned at school. Research involving Polish teachers (Librus, 2020) showed that 59% of them evaluate the effectiveness of remote teaching as low. This certainly has consequences for the engagement of the students and the effectiveness of the teaching and learning process. Therefore, taking into account the present need to return to online education, it is important to identify the factors responsible for the effectiveness of teaching (as perceived by teachers). Working in this area can enhance the resources that allow teachers to transfer their standard professional activities more effectively to the online environment.

Different goals were formulated for remote education during the pandemic, but the 'Maslow before Bloom' (Doucet et al., 2020) principle remained prevalent, which emphasised the importance of caring for students' integral development, both in regular and extraordinary teaching situations (Domagała-Zyśk, 2018; Domagała-Zysk & Knopik, 2019). In emergency pandemic teaching, apart from facing serious difficulties in ensuring student participation and engagement, teachers were faced with the necessity of acting as 'emergency units' to support the well-being of students who experienced severe challenges such as the serious illness or death of family members, digital exclusion, intensification of cyber-bullying, loneliness, and depression (cf. Ptaszek et al., 2020). Teachers were also supposed to be effective at taking on-the-spot remedial measures, particularly for students with special needs, an inability to access e-learning, and/or a high risk of dropping out. In many situations it was not possible for teachers to fulfil all

these requests and, as the studies show (Ptaszek et al., 2020), teachers' level of digital hygiene and general well-being was incredibly low.

An important element directly affecting the effectiveness of remote teaching during the pandemic was the transparency and order of activities at the level of a specific school. Błaszczak, Knopik, & Maksymiuk (in press) found that about 65% of the 482 parents they surveyed observed a methodical chaos in teachers' actions, caused by three main factors: a lack of common solutions at the level of a given institution (i.e. each teacher had their own strategy for remote teaching); substantial variability in the actions of a given teacher (frequent organisational changes, lack of adaptability); and poor communication with students and parents (delivering instructions through various channels in unclear and inconsistent ways). It can therefore be concluded that schools whose organisational culture was conducive to teamwork and co-operative learning before the pandemic have more easily coped with the development and implementation of a coherent remote learning system, resulting in more constructive communication with students and parents (Bush & Grotjohann, 2020).

Subjective teacher effectiveness

Teacher effectiveness is commonly understood as the capability of teachers to influence their students' educational outcomes. Palardy and Rumberger (2008) propose three dimensions of teacher effectiveness: instructional practice, teachers' attributes (such as enthusiasm for teaching and supporting students' achievements), and teachers' background characteristics, like years of experience or certification. Most commonly, teacher effectiveness is measured by external factors, e.g. student achievement (Doherty & Jacobs, 2013) or certain characteristics of learners such as motivation, engagement, persistence, self-efficacy or self-concept (Irvine, 2019).

'Subjective teacher effectiveness' can be understood as the degree to which teachers believe they can lead their students and influence their learning. It can be seen as a teacher's belief in his or her own teaching ability including preparation of materials, classroom management and assessment (Chang, 2012). For the purposes of this study, this term is narrowed to 'subjective effectiveness of emergency remote teaching', which is more precise and takes teaching conditions into account. This term can be defined as teachers' belief in their competence to teach in a remote mode so as to equip the students with the necessary knowledge and skills while ensuring that their emotional and social needs are met during the pandemic. Based on respondents' assessments of this belief, we adopt a subjective measure of teaching effectiveness (cf. Jacob & Lefgren, 2008).

Teachers' self-efficacy (TSE)

The effectiveness of strategies of educational continuity in the pandemic depended mostly on teachers' creative engagement, a competency which itself depends upon teachers' self-efficacy (TSE). Bandura defines self-efficacy as a set of 'people's judgments of their capabilities to organise and execute the courses of action required to attain designated types of performance' (1986, p. 391), and as individuals' beliefs in their capability to exercise control over challenging demands (1997). It is regarded as a multidimensional and context-specific construct (Skaalvik & Bong, 2003; Zimmerman & Cleary, 2006), grounded in the social cognitive theory that characterises humans as agents who can exercise some influence over what they do, and can form intentions, set goals, anticipate likely outcomes, monitor and regulate actions, and reflect on their personal efficacy (Bandura, 2006). Efficacy beliefs determine how people perceive opportunities and impediments, what courses of action they take and how perseverant they are when encountering barriers and difficult situations. A teacher's self-efficacy is widely recognised as their belief in their ability to influence students' outcomes (Wheatley, 2005) and plan, organise and carry out the activities required to attain given educational goals (Skaalvik & Skaalvik, 2007, p. 612). Following Bandura's (1997) social grounded theory, teachers' self-efficacy may be conceptualised as the confidence that one can employ the skills necessary to deal with job-specific tasks and cope with job-specific challenges and job-related stress. This is predictive of both teachers' practices and students' learning, and was found to correlate positively with perceived success, academic optimism, and hope (Sezgin & Erdogan, 2015); and negatively with teacher burnout (Skaalvik & Skaalvik, 2007; Kim & Burić, 2019, Schwarzer & Hallum, 2008; also see the metaanalysis by Shoji et al., 2015) and job-related stress (Gonzaleza, Petersb, Orangec, & Grigsbyd, 2017; Schwarzer & Hallum, 2008). Teachers' self-efficacy has also been examined in relation to high-stakes testing and educational triage (Gonzaleza et al., 2017); school leadership style (Gonzaleza et al., 2017; Fackler & Malmberg, 2016); students' achievements (Fackler & Malmberg, 2016); and students' motivation, satisfaction, confidence, and attitudes towards school (Zee & Koomen, 2016). It can be also moderated by teacher's age, seniority, type of school or the number of children in school (Bay, 2020).

Teachers' digital competence for remote teaching

Teachers' digital competence entails a set of skills (cf. Hinojo-Lucena et al., 2019) connected with communication and data literacy, online collaboration, digital content creation, digital security and problem solving. While some researchers argue that online teaching competencies are not substantially different from those used in face-to-face instruction (Bawane & Spector, 2009), others suggest that online teaching needs a different set of digital and pedagogical competencies, like virtual management skills and the ability to provide technological assistance and engage students through virtual communication (Easton, 2003).

For some years now, scientists have been aware of the fundamental significance of digital competence for teachers' sense of effectiveness and their students' educational success. Teaching effectiveness has been found to be connected with the intention to use technology (Anderson, Groulx, & Maninger, 2011; Banas & York, 2014; Valtonen et al., 2015); with digital competence and the use of ICT in schools (Hatlevik, 2017); and with teachers' innovative behaviour (Klaeijsen, Vermeulen, & Martens, 2018). Efficient ICT competences allow teachers to focus on subject content instead of technical support.

Remote teaching is education that takes place across distance and not in traditional bricks-and-mortar classrooms. It does not include in-person interaction between the teacher and students, as they work in different locations. It is understood not as a variation of teaching style, but a method of delivering instruction entirely online. Means, Bakia and Murphy (2014) proposed a model of online teaching and learning that includes nine dimensions: modality (fully online, blended, web-enabled face to face), pacing (open entry and exit or others), student-instructor ratio, pedagogy used by the instructor (expository, practice, exploratory or collaborative), role of online assessment, instructor and student's online communication synchrony (asynchronous or synchronous teaching), and type of feedback. All of these aspects should be carefully considered and planned before starting a remote course. Unfortunately, the pandemic situation of 2020 did not provide teachers with time to prepare for this tremendous change from teaching on-site to teaching online. Therefore, the remote teaching that took place during the first wave of the pandemic (spring and summer 2020) should be called emergency remote teaching (ERT, Hodges et al., 2020), which is defined as a temporary shift in instructional delivery to an alternate delivery mode due to crisis circumstances. It is characterised by a high level of improvisation and quick solutions in less-than-ideal circumstances and an extremely narrow preparation window. However, remote teaching competencies should become part of teachers' skill sets so that they will be prepared to incorporate remote teaching methods into their repertoire during future crisis situations.

Digital competence and skills are part of the Polish primary and secondary curriculum and teachers should be equipped with them before entering the classroom, but not enough has been done to prepare

new and in-service teachers for the implementation of this curriculum (Plebańska, 2017). ICT is still new and unfamiliar to many teachers; in a recent study by Ptaszek et al. (2020), almost half of the teachers (N = 671) said that they were not prepared for online teaching, and that they employed mainly static, non-interactive methods like sending a link to a film or a worksheet to be printed and completed by the students offline (cf. Librus, 2020).

Teachers' stress

Stress is a negative affective experience, a psychological reaction to environmental conditions that produce threats to well-being (Lazarus, 2006), and is often related to one's ability to cope with job-related tasks. While some level of positive stress – eustress – makes our work feel dynamic, negative stress – distress – implies that the work tasks are not seen as challenges but as threats and barriers (Skaalvik & Skaalvik, 2016). Teaching was regarded as one of the most stressful professions even before the pandemic (Johnson et al., 2005), because of heavy workloads, bureaucracy, time constraints, fear of evaluation, low professional self-esteem, and difficulties in maintaining a work-life balance (Mercer & Gregersen, 2020).

The global pandemic heightened teachers' stress level tremendously: it forced widespread school closures requiring immediate mastery of new technology and meant that many teachers had to instruct students while managing difficult conditions at home, teaching their own children, and/or taking care of elderly family members at high risk of developing severe illness. The potential stressors are thus numerous: the threats to their own and their students' health; the need to combine work and home life, often as parents themselves; pressure from school leaders; meeting students and parents' requirements in terms of the methods for conducting classes; and fear of negative external evaluation of their work (e.g. stressors brought forth by exam-based accountability policies, von der Embse et al., 2016). Teachers' stress and exhaustion was also triggered by the initial chaos of remote teaching. During this time, teachers were inundated with emails, texts and calls from principals, parents and students who expected them to provide clear explanations and guidance, while they themselves were experiencing cognitive dissonance caused by rumours, disinformation, and conflicting expert opinions (cf. Bin at al., 2020). Online delivery of courses can also blur the physical, temporal and psychological boundaries between school and home (MacIntyre, Gregersen & Mercer, 2020). Another stressor was being confined to the home during the lockdown and being unable to take part in physical activity, which is so important for physical and mental health.

Support from peer teachers and school leaders

Even without the challenges of the pandemic, many teachers struggle to meet the differentiated needs in their classrooms. Peer support and mentoring programmes offer help to teachers coping with these demands (White, 2018; Birney et al., 2018; Rachamim & Orland-Barak, 2018). Research reveals that competent support from colleagues predicted increases in teacher efficacy (Jungert et al., 2019). Many teachers believe that working in teams with colleagues, planning collaboratively, and achieving goals together contributes to their job satisfaction and sense of security at work (Edinger & Edinger, 2018). Support from colleagues boosts teachers' resilience and ability to deal with difficult situations (Castro, Kelly, & Shih, 2010). The most important element was the peer teacher's availability ('it felt like the peer support teacher was only an e-mail or telephone call away to provide support as needed', White, 2018). Online peer support was found to strengthen pre-service teachers' preference for collaborative learning and sharing (Liu, 2020; Hur, Shen, & Cho, 2019), and increase their self-efficacy for technological integration and intercultural sensitivity (Hur, Shen, & Cho, 2019).

Australian and Australasian experiences can be of a particular value when learning from the pandemic's challenges, as online learning communities were being established to provide teachers with peer support even before the crisis (Paris, Boston, & Morris, 2015), and were found to reduce the impacts of isolation, vulnerability and anxiety. These communities are of particular value for pre-service teachers who may share resources and strategies with more experienced staff and receive online support when their remote learning environment seems unsupportive (Mercieca & Kelly, 2018).

School leaders are responsible for creating vivid learning communities where teachers – feeling acknowledged and supported – are able to care intensively about their students' learning and well-being. The research shows that teachers need their school leaders' support mainly in the context of managing conflict and dealing with students' diversity (Harju & Niemi, 2018). During the pandemic ERT especially the issue of teachers addressing students' diverse needs definitely required support from school leaders.

Method

Research aim and questions

The aim of the study was to identify predictors of subjective effectiveness of emergency remote teaching (SEERT) that might be important for remote teaching pedagogy in general. The research was to answer the following questions:

RQ1: What strategies did the teachers use in emergency remote teaching (ERT) during the first four weeks of the COVID-19 pandemic?

RQ2: How did teachers evaluate the subjective effectiveness of emergency remote teaching (SEERT) and what are the predictors of their evaluation?

RQ3: Are there any significant differences in the following variables between teachers working at different levels (primary grades 1-3, primary grades 4-8, and secondary school):

> 1) effectiveness of teaching and effectiveness of education for students' well-being;
>
> 2) general self-efficacy (GSE, understood as a general sense of control over the actions taken);
>
> 3) peer support from other teachers and school leaders;
>
> 4) teachers' stress levels; and
>
> 5) teachers' digital competences

The variables are presented in Figure 1.

The study participants

In the study, 162 teachers took part but the final analysis included only the fully completed questionnaires, of which there were 154 (from 127 women and 27 men). The average age of the respondents was 43.46 years, while the average length of teaching experience was 16.94 years. As shown in Table 1, the study included teachers working at primary schools (where two educational stages are distinguished in the Polish system: classes 1-3 - integrated teaching and 4-8 - subject based teaching and secondary schools. Respondents were selected from these three stages of education because of fundamental differences in teaching experience. In grades 1-3, integrated teaching is usually conducted by one teacher. In grades 4-8, individual subjects are taught by different teachers and the frequency of classes in a given subject is similar across the country. Teaching in secondary school is highly diversified between schools and assumes a high level of student independence. The teacher training programs are also diverse: for elementary education candidates have to study in long 5-year courses, where not only content issues on key skills but also plenty of hours is devoted to psycho-pedagogical support for students. Subject teachers usually study in bachelor programmes on different subject and then they participate in 350-hour (45 ECTS) course on psycho-pedagogical teacher preparation. either simultaneously (55%) to their subject studies or in postgraduate courses (45%, MEiN 2019). This may mean that subject teachers are not equipped well enough into pedagogical competences that would allow them to offer support for their students or create

Figure 1.
Theoretical model presenting selected conditions of SEERT
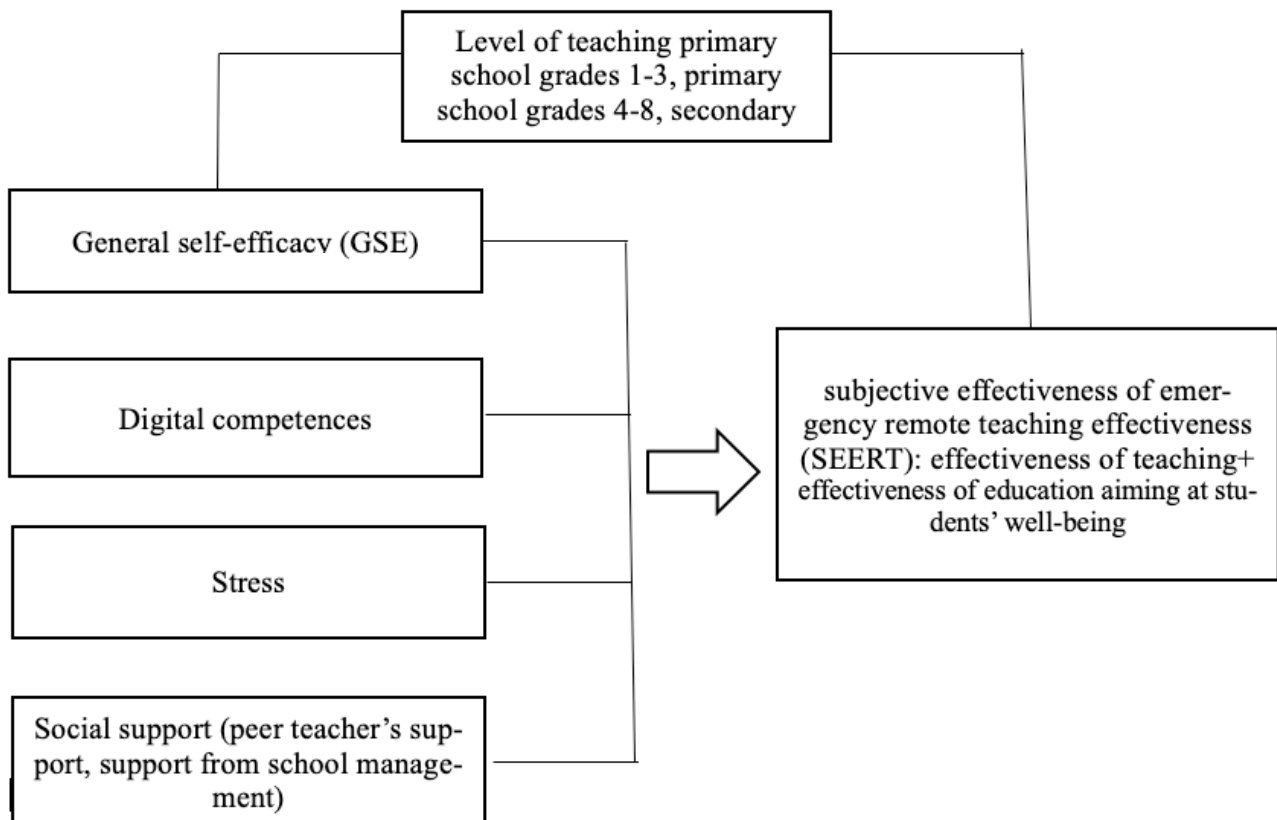
communities of care, especially for the students in traumatic of crisis situations (Keown, Carroll, Raisor 2020) or school environments recognized as peaceful, happy and encouraging (Calp 2020).

Table 1.

Type of teaching experience

	Type of teaching experience	N	%
1	Primary schools grades 1-3 – elementary education	41	26.6
2	Primary schools grades 4-8 – subject teaching	76	49.4
3	Secondary schools – subject teaching	37	24.0
	Total	154	100

The respondents represented 64 primary schools and 23 secondary schools in both rural areas (41 institutions) and urban areas (46 institutions).

Measures and procedure

The research was conducted by sending to participants an online form that included two tools: a) a bespoke 34-item survey on various aspects of remote teaching; and b) the Generalised Self-Efficacy Scale, or GSES (Schwarzer, 1993). The variables included in the first tool are listed in Table 2.

The second tool was the GSES, which was created by Schwarzer to assess a person's individual performance and sense of control over their actions. The GSES is a 10-item scale that studies generalised efficacy without referring it to specific behaviours and situations (thus providing an opportunity to evaluate the role of a generalised sense of efficacy in the assessment of individual activities). The task of the respondent is to react to each item by selecting one of four answers: 1 – disagree, 2 – somewhat disagree, 3 – somewhat

agree, and 4 – agree. The score therefore ranges from 10 to 40 points, with a higher score indicating greater self-efficacy.

The psychometric coefficients of the Polish adaptation of the GSES can be considered satisfactory (cf. Juczyński, 2001). Internal compatibility was established on the basis of a study of 174 individuals aged 25 to 55 (Cronbach's alpha coefficient was 0.85). The reliability of the tool was checked by using the test-retest paradigm (using a 5-week interval) on a group of 85 participants. The value of the correlation coefficient was 0.78. GSES normalisation was carried out on a sample of 496 people aged 30 to 55.

Our research started in the third week of school closure in Poland and was conducted for 10 days. Apart from the 34-item survey and GSES, the online form included an additional open question about the potential benefits of remote teaching.

Results

The analysis shows that the teachers' most frequent strategies for ERT were sending links to methodological materials and sending students instructions over the internet (communicators). Telephone calls with pupils and parents were the least frequent (see Table 3). The average time spent on remote teaching in one day was 5.92 hours[1].

The overall level of SEERT can be considered moderately high (*M* = 5.76 on a scale of 1-8). A slightly higher level of teaching effectiveness in relation to activities aiming at students' well-being was observed (see Table 4). The differences are statistically significant (Wilcoxon signed-rank test: Z = -3.486, p < 0.001).

Table 2.

Variables analysed in the 34-item survey

Description of variable	Number of items	Format or way of answering
Sociodemographic (sex, age, workplace, place of residence, seniority, subject taught)	6	Open questions
Conditions for implementation of distance teaching (e.g. equipment, cooperation with other teachers, guidelines from school management and the Ministry of National Education)	16	Scale from 1 (not applicable) to 4 (fully applicable)
Subjective evaluation of the effectiveness of distance education	2	Scale from 1 (low) to 4 (high)
Subjective evaluation of the effectiveness of time spent on distance teaching as compared to time spent in classroom teaching before the pandemic	1	Percentages (e.g. 50% indicates that the effectiveness of distance teaching is half that of the education on site)
ICT competences	1	Scale 1 (very poor) to 5 (very good)
Stress level	1	Scale from 1 (very high stress) to 5 (very low stress)
Time devoted to distance teaching	1	Number of hours
Frequency with which distance teaching methods were used	8	Average number of times per day on a scale of 1 (at least once a day) to 6 (six or more times a day)

Table 3.

Frequency of using distance teaching strategies

	Strategy	M	SD
1	Sending materials to be completed by students	3.56	1.271
2	Instructions sent via the electronic school journal	2.88	1.02
3	Phone calls to parents /pupils	2.72	1.08
4	Using online communication (e.g. Skype) to send instructions	3.95	1.91
5	Online tests	2.88	1.11
6	Sending links to ready-made teaching materials	4.35	1.47
7	Webinars/online classes	3.62	1.54

Table 4.

The level of subjective effectiveness of emergency remote teaching (SEERT)

Variables	M	SD
effectiveness of teaching	2.87	1.068
effectiveness of education aiming at students' well-being	2.60	.949
SEERT	5.76	1.511

An analysis of the relationship between the frequency of a particular strategy and the assessment of SEERT suggests that only two strategies were statistically significant: online tests and interactive lessons (webinars and online classes, see Table 5). This shows that these remote-learning methods, which may allow students to get as close as possible to the educational practices they experienced before the suspension of classes, have a positive impact on the SEERT as made by teachers. An important feature that these two methods have in common is the high level of teacher-student interaction that they involve, which allows the teacher to have more control over the teaching process (cf. Watson et al., 2012). There is no significant correlation between time spent on remote teaching and the assessment of SEERT.

An analysis of the relationship between SEERT and stress level, GSE, and level of support from peer teachers and school management indicates statistical significance for GSE and social support (Table 6). The correlation between stress and SEERT is significant at $p < .05$. This means that SEERT has somewhat of a tendency to decrease as stress levels increase.

In order to identify the predictors of SEERT, a stepwise regression analysis was conducted. It shows that the variables that best explain the effectiveness of remote teaching understood as the combined result of subjective evaluation of the effectiveness of the core curriculum implementation (subject knowledge) and education aiming at the development of students' well-being and emotional and social competences, preventive measures, value shaping etc. are: overall

Table 5.

Correlation coefficients (rho Spearman's) for variables: SEERT (subjective effectiveness of emergency remote teaching), frequency of use of a given method and time devoted to emergency remote teaching (ERT)

Variables	SEERT	Sending materials to be completed by students	Instructions sent via the electronic school journal	Phone calls to parents / pupils	Online communication (e.g. Skype)	Online tests	Sending links to ready-made materials	Webinar/online classes	Time devoted to ERT
SEERT	1.000								
Sending materials to be completed by students	0.066	1.000							
Instructions sent via the electronic school journal	0.009	0.215*	1.000						
Phone calls to parents /pupils	0.090	0.409**	0.048	1.000					
Online communication (e.g. Skype)	0.127	0.248**	-0.202*	0.317**	1.000				
Online test	0.369**	0.221*	0.059	0.081	0.258**	1.000			
Sending links to ready-made materials	0.187	0.448**	0.091	0.314**	0.379**	0.411**	1.000		
Webinar/online classes	0.348**	0.235*	0.042	0.182	0.500**	0.428**	0.514**	1.000	
Time devoted to ERT	0.017	0.149	0.088	0.082	0.111	0.007	0.115	0.187*	1.000

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

effectiveness (as measured with the GSES), peer support from other teachers, and digital competence. In total, these factors explain 33.2% of the effectiveness variance (see Table 7).

Analyses of the differences between groups of respondents at different teaching levels (grades 1-3, grades 4-8 and secondary school) in terms of stress severity, GSE level, SEERT (two aspects), social support and digital competence (see Table 8 and 9) show the following results:

a) The stress intensity level was highest among teachers of grades 4-8, and lowest among secondary school teachers (p < 0.05);

b) Effectiveness of education for students well-being was highest among secondary school teachers and lowest among teachers of grades 4-8 (p < 0.05);

c) Support from peer teachers was highest among teachers of grades 1-3, and lowest among secondary school teachers (p < 0.01).

Table 6.

Correlation coefficients (rho Spearman's) for variables: SEERT, stress level, GSE and level of peer support

Variables	SEERT	Stress level	GSE	Peer teachers support	Support from school management
SEERT	1.000				
Stress level	-0.181*	1.000			
GSE	0.516**	-0.330**	1.000		
Peer teachers support	0.266**	-0.207**	0.028	1.000	
Support from school management	0.101	-0.017	0.063	0.358**	1.00

Table 7.

Predictors of SEERT in stepwise models

Model		Unstandardized coefficients		Standardized coefficients		R^2	R^2 change	F	p
		B	SE	Beta	p				
1	GSE	.142	.021	.488	<0.001	.239	.234	47.614	<0.001
2	GSE	.140	.020	.484	<0.001	.311	.302	64.107	<0.001
	Peer teachers support	.432	.108	.270	<0.001				
3	GSE	.160	.020	.552	<0.001	.345	.332	26.386	<0.001
	Peer teachers support	.367	.108	.229	<0.001				
	digital competences	.284	.101	.201	.006				

Table 8.

M and SD for selected variables in groups of teachers of different levels of teaching

Level		Peer teachers' support	Support from school management	GSE	SEERT		Stress	Digital competence
					Effectiveness of teaching	Effectiveness of education for students' well-being		
Primary school grades 1-3	M	2.95	3.00	31.20	2.78	2.76	3.20	3.71
	SD	.921	0.87	4.66	.852	.888	1.20	.782
Primary school grades 4-8	M	2.39	2.81	31.97	2.72	2.39	3.61	3.42
	SD	.910	0.92	5.54	1.18	.925	1.21	1.158
Secondary school	M	2.36	3.08	34.03	3.08	2.89	2.97	3.33
	SD	.990	0.97	5.03	.996	1.01	1.10	1.20

Table 9.

Significance test of differences (Kruskal-Wallis test) between groups of teachers of different levels

	Peer teachers' support	Support from school management	GSE	Effectiveness of teaching	Effectiveness of education for students' well-being	Stress	Digital competence
H	9.642	0.908	5.760	3.037	8.112	7.119	1.894
Asymptotic significance	.008	0.341	.056	.219	.017	.028	.388

Discussion

The teachers demonstrated a moderately high level of SEERT. Statistical significance was found for the higher level of teaching effectiveness in terms of transmitting knowledge, as compared to developing well-being and social and emotional skills. This proves that online education as experienced by the participants was more effective for imparting subject knowledge than nurturing students' emotional and personal competencies. An analysis of dominant online learning strategies (sending links and instructions to learning activities) shows that they address students' cognitive needs, but not their needs for general well-being, social relationships or personal development.

Amid efforts to sustain educational continuity during the period of physical distancing, the research has shown that the three most important predictors of SEERT are: high levels of generalised self-efficacy (GSE), support from peer teachers, and digital competencies. These results should be seen not only in relation to the pandemic, but in a broader perspective of teachers' professional effectiveness and the goals of teacher training programmes. The key issue for teachers' GSE seems to be the transferability of resources. Transfer in learning and transferable resources are revealed when previous knowledge and skills influence the acquisition of new competencies (Justice, Rice, & Warry, 2009). Transferable resources impact on one's level of self-efficacy and can be considered universal competences that build one's adaptive potential (Billing, 2007; Magne & Deci, 2005). This potential is crucial when a person faces an unexpected challenge; it enables them to stay positive and creatively cope with the new situation. This has a direct implication for teacher training programmes: in future emergency situations, trainees who are equipped with transferable resources that enhance their self-efficacy will be able to cope with the emerging difficulties.

This effectiveness in dealing with difficult situations is strengthened by social support, which in each new situation allows for shared responsibilities, joint development of cooperative learning strategies, and use of common resources. The most common benefit of remote education indicated by the respondents, apart from increasing student autonomy, was the possibility of solving problems together with other teachers. This confirms the importance of peer support at both the intellectual and emotional level. Analyses indicate that social support was highest for teachers of primary grades 1-3, which is consistent with the generally more collaborative nature of work at this level of education.

An additional factor influencing the effectiveness of teaching is digital competence, i.e. the knowledge and skills that allow teachers to adapt to the new online paradigm. The lack of these skills significantly limits their possibilities for action, which translates into less effectiveness. According to international research (Fraillon et al., 2020; cf. Fraillon et al., 2013), the level of teachers' digital competence varies greatly across individuals and education systems, in part because teachers' professional development rarely includes formal training in digital skills. Our results confirm that teachers tend to use new technologies in the classroom for routine tasks, such as presentations or information retrieval, rather than for more complex ones related to the process of acquiring knowledge and skills, such as simulation, modelling, and concept-mapping (Fraillon et al., 2013, 2020). The analysis shows that the teachers' most frequent digital strategies in ERT were basic ones, like sending instructions or links to methodological materials. On the other hand, a significant positive relationship was demonstrated between SEERT and such digital strategies as online tests and webinar classes. These activities require more advanced digital competencies, but at the same time allow teaching to be conducted in accordance with a standard similar to on-site education.

According to self-determination theory (Deci & Ryan, 2012), a person's internal motivation and effectiveness are impacted by the extent to which three fundamental needs are met: belonging, autonomy and competence in the environment where the person lives and works. Our results support this and outline a more general recommendation concerning strengthening teachers' personal resources so that they are better prepared to cope with new situations (including successive waves of the pandemic and other crises which may suddenly appear and dramatically change the existing rules of societal functioning). On the one hand, therefore, the long-term process of building self-efficacy is

strongly connected with shaping the image of oneself (including the processes of forming self-knowledge and self-esteem), which can be strengthened through psychological support, supervision, and personal development workshops (an area that is absent from the Polish model of teachers' professional development programmes, cf. Chrzanowska, 2020). On the other hand, the continuous development of professional competences is consistent with the trend of modern communities placing more emphasis on digital skills, pro-ecological policies, and intercultural education. The shaping of intrapersonal resources should be strengthened by generating a culture of teamwork, in which a single teacher does not have to face challenges on his or her own every time, but can count on the constructive support of peer teachers (Drossel et al., 2019).

The results also show that although there are no statistically significant differences in GSE levels among the primary and secondary teachers, there are differences in educational effectiveness. The lowest level of effectiveness is found among teachers of grades 4-8, which may reflect that the specific developmental needs of students in early adolescence are quite difficult to meet through remote teaching. The analysis of supportive methodological materials provided to teachers in Poland shows that they contain almost no content referring to students' emotional and social needs, but focus only on cognitive aspects and subject matter. This finding, and the observed differences between teacher groups, indicate that the provision of preventive materials can be identified as a gap in remote teaching. It also turns out that teachers from grades 4-8 feel the most stress associated with the pandemic and the implementation of remote teaching in these conditions. An additional factor that may have increased their stress level was the need to prepare students for the final exam after grade 8 (which is usually perceived as an external measure of teaching effectiveness). Linking students' test scores to ratings of teaching quality may increase teachers' stress (von der Embse et al., 2015). Taking this into account there is a need to support subject teachers mainly in psychosocial competences that could enhance their self-efficacy and perceived self-effectiveness. This should be connected with promoting resilient coping strategies such as positivism, tolerance to frustration or locus of internal control (de Vera Garcia, Gabari Gambarte 2019).

Differences in the scope of support from peer teachers indicate that teachers from grades 1-3 received the most support. This relates to the general tendency for teachers of younger age groups to engage in more teamwork. It is worth noting that such cooperation would be particularly advisable within the framework of subject education for older age groups, where several teachers deliver sessions on different subjects

in a given class. The lack of support in this area and the fact that individual teachers must create their own solutions causes methodical chaos, which has been identified by parents as the main barrier to their children's learning during the COVID-19 pandemic (Błaszczak, Knopik, & Maksymiuk, in press).

The necessity of implementing remote teaching during the pandemic means that more countries should introduce online teacher support programmes, which are well developed in countries where technology is already highly integrated into pedagogy (Paris, Boston, & Morris, 2015; Mercieca & Kelly, 2018). There is a strong need to learn from the first phase of the pandemic and design a contingency plan that includes a system of support that enables teachers to embrace new pedagogies and assume new functions beyond teaching in order to support students and their families. As the benefits of online peer support programmes are evidence based (e.g. Yildirim, 2019; Paris, Boston, & Morris, 2015; Mercieca & Kelly, 2018), these programmes should be implemented into teachers' education and professional practice on a regular basis.

Teachers are expected to prepare their students to live and work in a society of knowledge. To do this, difficult tasks – even emergency remote teaching – should be treated as challenges rather than threats. The experiences of teaching and learning during the pandemic should be collected and evaluated not only to document their historical importance, but also to help educators to navigate obstacles and solve problems in the future.

Conclusion

An important component of remote education is teachers' evaluation of its effectiveness. Teachers who assume from the very beginning that ERT is prone to failure will have a negative impact on the attitudes and motivation of students. This research identified predictors of teachers' evaluation of SEERT. It turned out that the three most important explanatory factors are: 1) GSE, understood as a generalised sense of one's agency; 2) social support from peers; and 3) level of digital competence. The need to react quickly to an unforeseen situation (of which there is likely to be more in our fast-changing world) requires more general resilience and help from others to work out common solutions, rather than hard IT competence. The results can be used to plan the path of teachers' skill development so as to strengthen their adaptive potential, allowing them to work effectively in new conditions.

The implications for educational practice are that: elements for building self-efficacy should be incorporated into teacher-training programmes; peer support models should be implemented in teacher education and professional development

practices (e.g. peer group mentoring programmes, cf. Pennanen, Heikkinen, & Tynjälä, 2018); and digital competency among teachers and trainees should be strengthened not only at the routine communication level, but also as a new paradigm for designing courses and addressing students' complex cognitive, social and emotional needs.

Limitations and further research

The study was carried out in the fourth and fifth week of the COVID-19 school closures in spring 2020. On the one hand, this might be considered as sufficient time for the shift to ERT to have been completed. But on the other hand, during this period teachers and learners were probably still adapting to the changes. It is likely that the implementation of a longitudinal paradigm with the variables being measured at two or three different stages of the school closure would allow for a finer-grained analysis of the methods, strategies and effectiveness of remote teaching.

One more limitation stems form the fact that the research has been based on self-reporting measures. In futur research more objective tools should be used. It might also be profitable to ask other school actors (students. School leaders and policy makers, parents) about their perception of teaching effectiveness of (emergency) remote teaching.

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Footnotes

[1] Polish teachers spend on average about four hours a day delivering face-to-face instruction to students.

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