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Online Tools for Exercises in Digital Remote Education in Elementary School

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Introduction

March 2020 saw an unparalleled change in public education in Hungary due the Covid pandemic, which resulted in the sudden emergence of remote education based on a Hungarian Government Decree (A Kormány 1101/2020. [III. 14.] Korm. határozata, 2020). This digital remote educational context meant "learning that happens outside of the classroom, with the teacher not present in the same location as the pupils. This includes both digital and non-digital remote solutions" (Ofsted, Gov.UK, 2021, Para 6). As a result, both teachers and students –depending on one another – had to overcome the educational challenges of remote learning via digital technologies. It also became obvious for teachers that they needed to reconsider their traditional roles and become facilitators and supporters for their students to a greater extent. Furthermore, the Hungarian Educational Authority emphasised that it is also crucial for teachers to aid students' autonomous learning and information gathering and processing (Oktatási Hivatal, 2021). At the same time, teachers had to improve their own digital competences and extend their teaching methodologies related to online opportunities not only in Hungary, but also across Europe (Kim & Ansbury, 2020; Katić et al., 2021).

Our online questionnaire study conducted in 2020–2021 focused on elementary school education since it educates learners aged 6–10, which is of primary significance. During this life stage, children acquire basic knowledge in the presence of the teacher. Moreover, supportive teaching and learning environments are essential. A questionnaire for elementary school teachers was designed to explore the following areas: communication (including students, teachers, and parents), exploring and piloting digital platforms used daily, which utilize age-appropriate info-communication opportunities, enhance learning motivation, and apply proper assessment and evaluation during digital remote education. Bernhardt et al. (2021) revealed that elementary school teachers claimed that the key component of successful digital remote education was the availability of appropriate digital tools. The most widely used platforms were E-Kréta (Public Education Registration and Learning Basic System) the Hungarian school administration system, and Facebook Messenger, which teachers and parents used in order to have a unified and practical platform for an adequate

channel of information. Thus, it can be claimed that teachers' communication with both pupils and parents was efficient, but characteristically informal.

Our present study reveals the online tools used by the respondents when giving their students various exercises on digital platforms, the frequency they applied a specific virtual platform, and the efficiency according to the respondents' perceptions during various pedagogical activities. Also, it will be discussed how the participant teachers extended their online evaluation and feedback repertoire and how they became more motivated and efficient to provide feedback on their pupils' academic performance using virtual tools.

Literature review

Several researchers and teachers have published their results about the benefits and challenges of digital remote education. Fekete and Porkoláb (2020) conducted research in the context of secondary and higher education and found that students were mainly satisfied with the methods of quarantine pedagogy (teaching methods and techniques applied during remote online education during the Covid lockdown period), while among the challenges they mentioned technical problems, the lack of proper digital tools and platforms, as well as the extra workload for both students and teachers. Their study emphasised that several problems became serious, e.g., inequalities of society or socially disadvantaged students lagging behind. At the same time, new educational problems were found, such as technical challenges, the overburdened information and communication technology (ICT) infrastructure, the lack of students and teachers' competences on how to handle different virtual platforms and tools. Magyar et al. (2021) detected similar challenges when investigating students' motivation for learning during the lockdown period of 2020–2021. Similarly, Magyar and Ambrús (2023) conducted a focus group interview with teachers about their experience of digital remote education. Furthermore, different potential digital tools of learning and teaching (e.g. Bring Your Own Device, BYOD) was discussed by Molnár (2020).

Other studies focused on different fields of education related to quarantine education, including specific regional investigations (Furcsa et al., 2017; Bakonyi et al., 2020; Czirfusz et al., 2020; Bernhardt et al., 2021). The research group "DiO" (Digital Educational Experience, Czirfusz et al., 2020) revealed that Facebook Messenger groups were most widely and efficiently applied by teachers and Google Classroom – often supported at the institutional level – was also a popular platform. Furthermore, YouTube was used to a lesser extent and Redmenta emerged as a platform extensively used for practising and testing. Valuable

studies have been published about the education of young children, their families, and kindergartens. Bakonyi et al. (2020) revealed that all things considered, parents and teachers of kindergarten children assessed their communication and the exploitation of online opportunities as efficient. The most demanding challenges for parents were the sudden changes in routine and performing at their jobs rather than the shift to digital online kindergarten education.

Method

The data of our study was provided by Hungarian elementary school teachers (N=71). The data was gathered at the end of academic year; therefore, it is supposed that teachers were fatigued, in particular due to the challenges of digital remote education. The vast majority of the respondents (96%) were females, which ratio is not surprising according to findings of the Hungarian Central Statistical Office: the distribution of female (n=64611) and male (n=10564) teachers working with school children, aged 6-10 in Hungary (Központi Statisztikai Hivatal, 2020-2021). In terms of age, more than half of the participants were aged between 40–59; 25% of them were between the ages of 40–49, while 31% represented the 50–59 age range. The youngest age-group (aged between 23–29) represented 17% of the respondents while the oldest one (60–64) was 7%. These results corresponded to the average age of Hungarian teachers 47.6 (Balázsi & Vadász, 2019). Regarding age and teaching experience, it is also essential to explore how they are related to teachers' ICT skills and competences and their motivation to apply digital tools in their teaching. A survey by the European Commission (2019) detected that the proportion of Hungarian teachers perceived and assessed their own ICT competences as proper or fairly proper, thus exceeded the European average.

The majority of respondents came from 46 settlements of the Jászság micro region. During the data collection period, more than 68% of the participants were teaching in towns or cities. It is essential to note that all of the respondents were teaching in public elementary schools.

The research instrument, a piloted online questionnaire in Google Forms, covered the following three areas to gather information from the target population: 1) applied digital platforms and tools 2) experience of remote digital education (selection and testing of online tools), and 3) variety of methods. In the present research context, the application of an online questionnaire can be considered relevant since during the 2020–2021 lockdown, merely online data collection was feasible. Furthermore, quantitative data can ensure systematic

and standard measures (Boncz, 2015).

The first phase of data collection was conducted in 2020, while the second sharing of the questionnaire in various online elementary school teacher groups took place in 2021. Subsequent to inspection, all the responses in the completed online questionnaires were regarded suitable for data analysis. In what follows, our study will reveal major descriptive statistical findings.

Results and discussion

We will show and discuss the results related to the frequency and perceived efficiency of online platforms and tools and their application during the different phases of a lesson for various exercises.

The results of processing the data revealed that the respondents from elementary schools gave their students various exercises that the students had to solve in different online platforms, and that the participants used these online venues and tools with a varying degree of frequency. Furthermore, the respondents self-assessed their digital remote teaching efficiency and the practicality of the applied online opportunities in different ways.

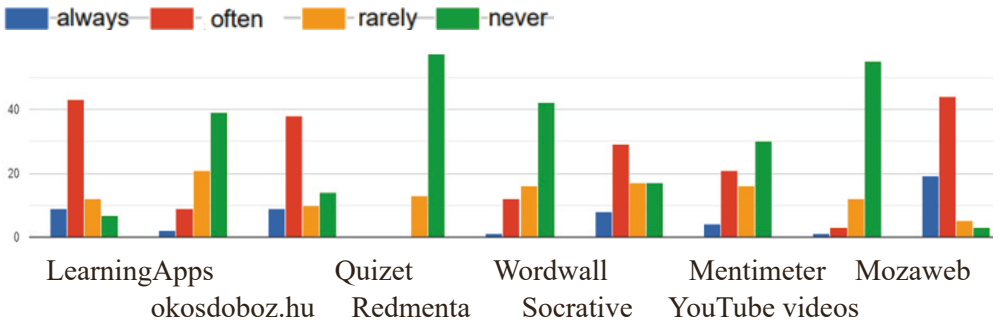

Figure 1
Frequency of using particular digital platforms by respondents (N=71)

Figure 1 shows that the most often used online platforms for solving exercises are as follows: YouTube (44%), LearningApps (42%), Wordwall (38%), as well as okosdoboz.hu (24%). Although to a lesser extent, but Redmenta (21%), Mozaweb (11%), Quizlet (4%), and Socrative (2%) also emerged among the answers. The data also revealed that Mentimeter was fully neglected.

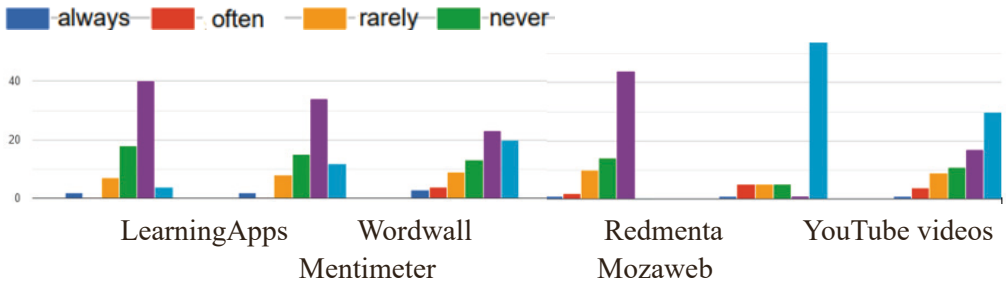

Figure 2a
Respondents' perceived efficiency of digital platforms used to do exercises (N=71)

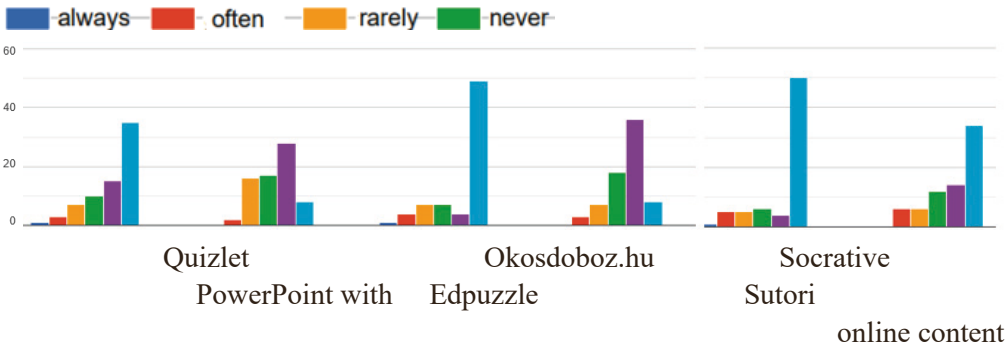

Figure 2b
Respondents' perceived efficiency of digital platforms used to do exercises (N=71)

Based on Figures 2a-b, it can be claimed that it was YouTube (43%), LearningApps (40%), Wordwall (37%) and Okosdoboz (24%) that the respondents considered as the most applicable and efficient online tools to achieve educational goals including doing exercises. Based on the responses, it can also be established that the respondents evaluated these platforms as fairly efficient, and only less than 2% found them not properly adequate. It was also discovered that the least frequently used platforms for exercises were Mentimeter, Quizlet and Mozaweb among the respondents.

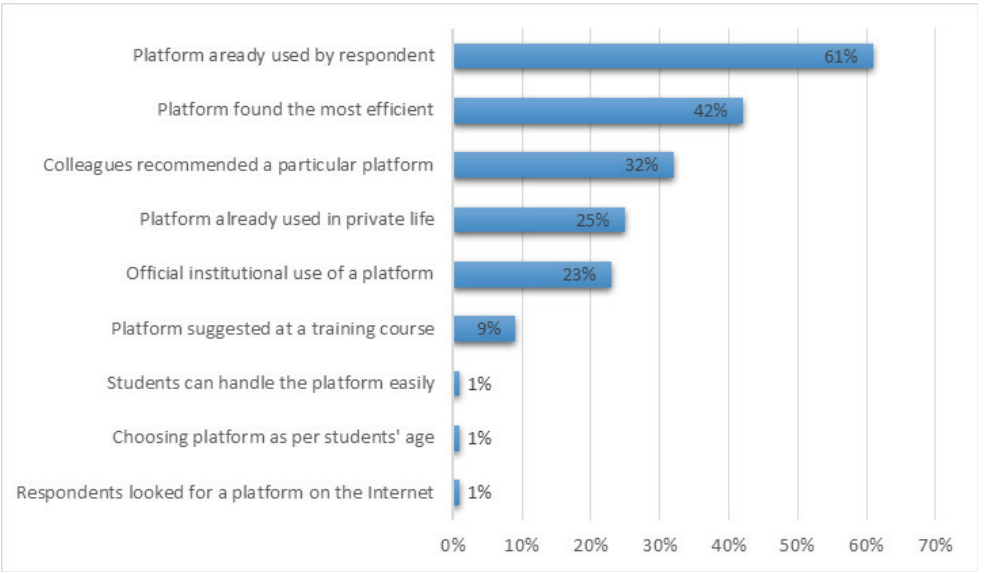

Figure 3
Reasons for respondents' selection of a particular digital platform for their students to do exercises online (N=71)

In terms of the most frequently used platforms for exercises, three categories can be distinguished based on the participants' reasons and motivation: 1) they have already been familiar with them (61%), 2) they found them the most efficient (42%), and 3) their colleagues recommended them (32%) (Figure 3).

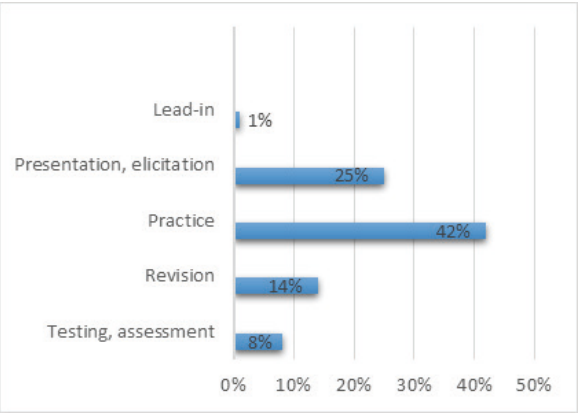

Figure 4
Sharing and sending exercises from traditional paper-format student's books and workbooks online (N=71)

It was also explored what type of online tools teachers applied during their teaching activities in their lessons. Figure 4 reveals that during digital remote education, there was a characteristic use of traditional teaching tools adapted to the online platforms of Messenger, E-Kréta, Facebook group, or e-mail. That is, teachers sent the particular teaching materials through these platforms, which were primarily applied during the practice (42%) and the presentation (25%) phases of lessons. A bit more than 10% of the respondents used these platforms to lead-in, to test, or to assess and/or evaluate.

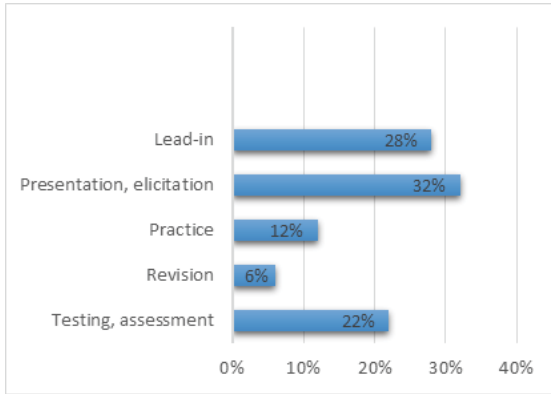

Figure 5
Oral messages via digital chat interfaces (N=71)

The lead-in (28%) and presentation (32%) stages were mainly carried out via oral discussion and chatrooms, which were also applied during testing and assessment and evaluation. Regarding the stages of practice and revision, discussions and chat are under-represented (Figure 5).

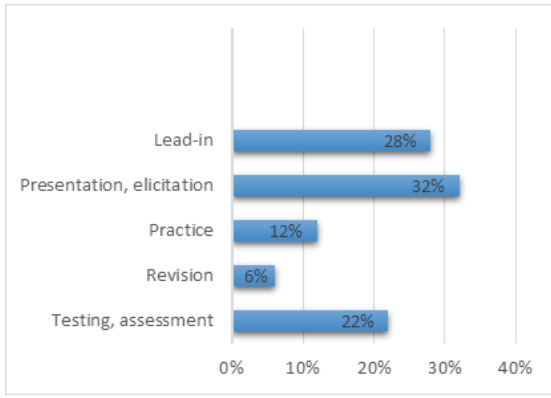

Figure 6

Written messages via digital chat interfaces (N=71)

Sending written messages for several purposes meant, not only sending exercises, but further teaching and learning opportunities. Figure 6 shows that several educational activities were conducted through messages on chat platforms (e.g., Messenger), among which the most common one was testing and assessment (29%). Furthermore, the chat function was used to a similar extent for practice (23%), while it was not typically used for lead-in (17%), for presentation (19%) and for revision (12%).

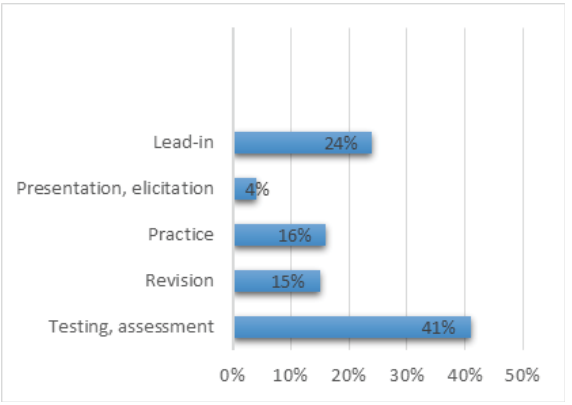

Figure 7
'Questionnaires' option of E-Kréta (N=71)

The E-Kréta school administration system was initially launched to keep the school register, record assessment and evaluation, as well as other teacher-student activities. However, during digital remote education, elementary school teachers attempted to exploit further features of this platform. They got acquainted with the "questionnaire" function and commenced to use it with children and parents alike. Figure 7 reveals that the function of testing and assessment and evaluation is overrepresented (41%), and it was hardly used for presentation and elicitation (4%). Furthermore, the respondents used the "questionnaire" function of E-Kréta as a non-simultaneous opportunity for lead-in, practice, and revision in 18% on average. This result can be partly due to the fact that it was more difficult for elementary school children to use this platform autonomously compared to an online chat platform. Finally, E-Kréta was suitable for sending tests according to the age factor of the students.

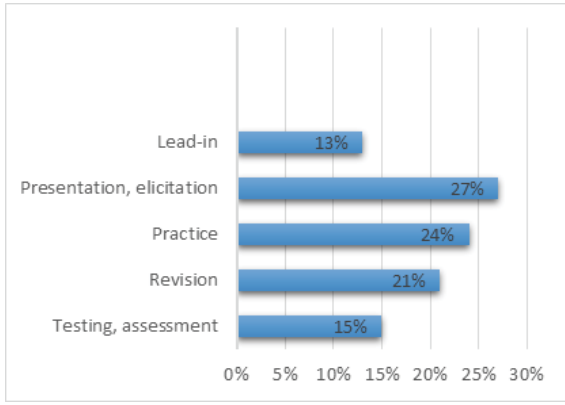

Figure 8
Self-made teaching materials via word, excel, pptx (Microsoft Office) (N=71)

Figure 8 displays the supplementary materials the participant elementary school teachers created for their pupils, using the different applications of Microsoft Office. During their teaching processes, they developed materials typically for presentation (27%) and revision (21%) to support the learning of their students. Thus, it can be concluded that it was less typical that elementary school teachers used the materials they created to start and to finish the lessons, that is, to use them to enhance learners' motivation and to test their performances.

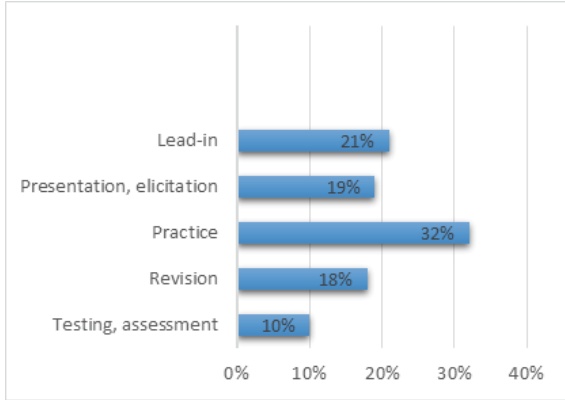

Figure 9
The use of teaching materials available on online platforms during digital remote education (N=71)

During digital remote education, teachers' digital competences is also greatly developed by constantly exploring and exploiting exercises and activities already available on various online platforms. Figure 9 reveals that these ready-made accessible exercises and activities were mainly used for practice (32%) (e.g., on Wordwall, okosdoboz.hu, LearningApps.org sites) while they were also popular during lead-in (21%), presentation (19%), and revision (18%). As it can be seen, during testing, their infrequent use is characteristic (10%).

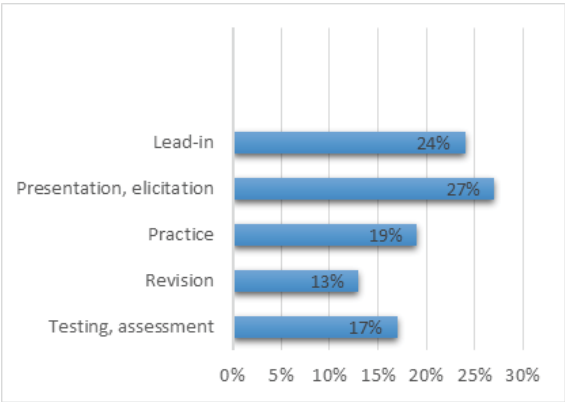

Figure 10
Digital remote education via simultaneous lessons (N=71)

Figure 10 reveals data about the most debated digital remote education situation: teaching children during live lessons. At the beginning of the lockdown period, there were no live lessons held at elementary schools due to the fact that parents were overburdened by problems with Internet access and problems with using ICT devices and to the age factor of elementary school children. However, there was a gradual shift towards live online lessons. Our research showed that the focus was to find the appropriate pedagogical activities that happened during these virtual lessons. The results showed that using adequate methods and work forms, an online live lesson can follow the same stages of traditional off-line ones. The most highlighted stages were presentation, elicitation (27%) and lead-in (24%).

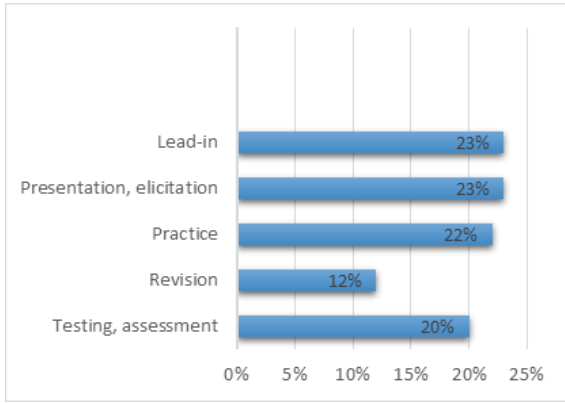

Figure 11
Use of photos and/or video recordings during digital remote education (N=71)

Subsequently, we explored to what extent elementary school teachers used photos and video recordings to support their teaching processes with ICT tools. The results show similar percentages; that is, they applied these visual and audio-visual tools for lead-in (23%), presentation and elicitation (23%) and practice (22%). Surprisingly, they aimed to use it for testing and assessment (20%), but they regarded it as less suitable for revision (12%) (Figure 11).

To sum up quantitative data, it can be claimed that the descriptive statistics data revealed that – according to the responding elementary school teachers' perceptions – their methodological awareness and online teaching competences developed during digital remote education which expertise can be applied during traditional in-class educational processes as well. Most of the respondents said that during digital remote education lead-in, presentation and elicitation, practice, revision, testing and assessment, and evaluation were typically carried out within the framework of live lessons.

The qualitative data elicited via the open-ended items of our questionnaire revealed that teachers applied traditional and innovative online methods and tools to provide feedback, assessment, and evaluation. That is, teachers encouraged their pupils in a straightforward way by giving them positive and formative feedback through oral and written channels, available on digital platforms e.g., compliment cards, self-made certificates, emoticons, and gifs. They said: *"I send stickers on the spot, at least three digital badges to evaluate a students' performance every week, notes in red in the school register every two weeks and formative assessment of exercises. During 'live' meetings I point at a particular student's work"* (P5). *"... hug smiley"* (P21) *"...a written school report*

in first grade" (P14).

Summative assessment was also typical and frequent (42%) since characteristic feedback forms applied by elementary teachers were: marks entered into the register based on marks, small marks, plus points. They mentioned that: *"They collect small fives. Ten small fives make a big five"* (P35)*." "Five pieces of homework is worth a five, performance during a lesson is also a five"* (P10).

The respondents emphasised that during teaching supported by ICT devices, the modes and importance of compliment and exercise assessment must be done tailored to the students' personality: *"Personalised immediate feedback and stickers…"* (P2). Several respondents also underlined that despite the optional nature of attendance in the online lessons, it was also accomplished by a mark. For the sake of motivating, they also gave marks to reward students' workloads in the lessons, and for doing their homework.

Little data was provided regarding the application of particular digital platforms and programs. The respondents said: *"I use the colour-code red to assess exercises in Microsoft Paint program"* (P42). *"I use the digital opportunities: coloured tick, smileys, stars, and smiley sun emojis on Facebook wall"* (P22). *"…Wordwall games."* (P8).

In order to motivate their pupils and make exercises easier for them, one of the respondents used a unique technique. They described it as follows:

I put the names of all of the students into a jar and I've been drawing one name randomly every day since March. The one whose name is selected is obligated to do the exercises, related to merely one subject chosen by me and everything else is optional. This is a great reward for the children. Another example is that every Wednesday we have a so-called 'Breather Wednesday'. On these days, I give them fewer required exercises and more optional ones. If they feel like doing them, they can get top grade for it. Both children and parents like this as they can relax a bit. It works for me. (P9)

One of the respondents rewarded her students with *"golden tallérs [coins]"* (P37) as a form of reward when reading and processing the compulsory reading, titled Rumini (Berg, 2006), since golden tallérs [coins] play a significant role in the life of the protagonist, a sailor little mouse.

Cooperation between teachers and parents are represented by procedures based on discussions and a reward system shared with the parents:

We reward together with the parents. If the child does well in a lesson and does his/her work at home expected by the parents, then he/she is rewarded at home by the parents. If one of the conditions is not fulfilled, the child can't get the daily/weekly reward. (P59)

"Based on a consensus with the parent, the children can get various rewards (for example, family cinema evening, or the child can choose what to

have for lunch)" (P61). Thus, it can be concluded that the methods of online assessment and evaluation and rewarding can be considered as a key issue of remote digital education.

Conclusions

Based on the findings, it can be stated that the participant elementary school teachers used various online platforms and tools for doing exercises with their pupils on a wide variety of digital platforms. It was established that there was correspondence between the most often used platforms and the ones, which were perceived as the most practical ones by the participants. That is, the majority of elementary school teachers exploited the opportunities of YouTube, LearningApps and Wordwall to motivate their students to do exercises online. Furthermore, it can also be claimed that digital remote education at elementary school level in 2020–2021 contributed to the up-grading of teachers' methodologies and techniques in terms of rewarding, doing exercises etc. with the most up-to-date 21st-century digital opportunities.

In sum, it can be claimed that with the aid of online applications (emoticons, virtual hugs, gifs) and platforms, the possibilities of evaluation and feedback methods have been extended. Elementary school teachers have become aware of the significance of providing feedback, and they have done so more frequently for particular exercises, homework assignments, and student performance during lessons. This was essential due to the lack of personal contact and – consequently – the more intensive need for individual and personalised feedback. As a result, motivation and rewards became quicker and more efficient by applying digital opportunities. Also, a much closer cooperation with parents has become vital so that the teaching and learning processes can operate with as little difficulty as possible in home environments as well. All things considered, the participant elementary school teachers faced several challenges; however, they also benefited greatly from the experience of digital remote education.

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Abstract

Digital remote education (2020–2021) presented unprecedented challenges worldwide for both teachers and students at all levels in educational processes.. Hungarian elementary school teachers typically autonomously explored online methodologies and techniques as platforms to meet the criteria of effective digital remote education. The aim and the main scope of our online questionnaire study was to gain insights into the efficiency of various digital platforms and opportunities that the participating teachers (N=71 teaching 1–6 grades explored and experimented with. The research question aimed to elicit how the respondent elementary school teachers were able to apply various digital tools to support their pedagogical practices during the following phases of instruction: lead-in, presentation and/or elicitation, controlled and free practice, revision, and evaluation and assessment.