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USE OF TECHNOLOGY IN EDUCATION DURING LOCKDOWN 2020 IN N. MACEDONIA

Abstract

Due to pandemic, Macedonian teachers have shifted to online teaching as all other teachers in the world. It is important to research how prepared they were, how often they were using digital approaches and what groups were more dominant or disadvantaged. This paper is reflecting the findings from a research that in November 2020 has surveyed 524 Macedonian teachers in usage of digital tools and approaches during the lockdown period. Macedonian teachers have been using from 3 to 5 different digital tools and approaches during online teaching because of Covid-19.

The most used tools were Virtual classroom software, Synchronous video-communication tools and Sharing documents and text messages. The least used were Creating Videos and Presenting videos. On a daily basis, VET teachers have used the biggest variety of digital tools and approaches. Younger teachers are using a smaller number of different tools and approaches compared to older teachers. The general conclusion is that Macedonian teachers were adequately prepared in usage of digital tools and approaches during online teaching.

Keywords: Online teaching, Digital tools, Virtual classroom software

Introduction

Because of the Covid-19 pandemic, schools in Macedonia were closed in March 2020 and all educational activities continued online. The academic year 2019-20 was finished online. Teachers, students and parents have experienced a lot of difficulties because of the new situation that nobody was prepared for.

“Current teams have to deal with a huge level of discrepancy in each member's local context, from different home situations to

internet reliability, all the while ensuring that everyone's voices are heard.” (Feitosa, 2020).

In order to somehow overcome arisen discrepancies, different activities and approaches should be implemented during online classes so no one can feel left out. During summer vacation 2020, a national platform for teaching activities and materials was prepared and many teachers have been trained to become teachers' trainers. All teachers in the country have attended organised training, either directly from the

Ministry of Education and Science or dissemination in own school. Academic year 2020-21 has started with a month of delay, and after initial problems, continued uninterrupted entirely / completely online.

In November 2020, teachers already had in total 5 months of online teaching experience and significant capacity building training. The survey reflected in this paper has been prepared to scan the usage of different technological tools and approaches during the online teaching because of Covid-19 and the impact of these tools/approaches. The survey consisted of 15 questions designed to explore the use of digital technologies and continuous professional development of teachers. This paper will focus on analysis of answers only on a few of these questions.

There are 44 VET schools in the country with total of 3,255 teachers. There are 20 General secondary schools (Gymnasia) in the country with total of 1,334 teachers. Out of these secondary schools 12 VET schools and 12 General secondary education schools were selected – 6 small schools and 6 large schools from each type. There is no formal categorisation of small/large schools in the country. For the needs of this survey, it was decided to consider as small all schools that have 50 or less teachers, and as large schools that have 51 and more teachers employed. The selection of all these schools was done as partially random having in consideration only geographical distribution of schools across the country.

The online survey was launched during the second week of November 2020 and lasted for a week. The total of 524 responses were received – 289 from teachers from VET schools and 235 from teachers from General secondary schools. The received 524 answers represent 11.4% of all teaching staff in all

VET and General secondary schools, which is enough to consider the results and findings as statistically relevant. Looking on the distribution of responses based on age, it can be seen that it is in line with the age profile of the teacher population in Macedonia⁵⁶, which also supports the relevancy of received findings and results.

Findings

The e-learning theory framework is based upon three principal dimensions: users, technology, and services related to e-learning (Aparicio, 2016). This research was focusing on tools and approaches as services for learning.

“Information sharing is the most hindered team process when in high virtuality” (Feitosa, 2020). In order to encourage information sharing, teachers should engage different this in mind, the main question on which the answers were analysed in this paper is about usage of different digital tools/approaches during the Covid-19 lockdown and how often were they used. Several different tools/approaches were suggested. The following table presents all the suggested tools/approaches on which the teachers were answering. There was no option to add additional tool/approach.

⁵⁶ State Statistical Office of North Macedonia, MakStat Database, (makstat.stat.gov.mk)

Table 1.

Codes Key and descriptions of options for answer on usage of different digital tools/approaches during the Covid-19 lockdown

Codes Key	Description
Virtual	Virtual classroom software (e.g. Ms Teams, Google Classroom, Moodle)
Synch	Synchronous video-communication tools (e.g. Zoom, Skype, WhatsApp, Facebook live)
Shdoc	Sharing and exchanging of documents (“cloud services” e.g. Basecamp Dropbox, Google Drive, online editors for collaborative artefacts)
Shscr	Sharing your (the teacher’s) screen (screen casting), for example, to make presentations or set tasks
Brain	Brainstorming, quizzes or polls (e.g. mind-map, multiple-choice questionnaires for (self-assessment)
Plan	Planning and organisational tools (e.g. Mail and Calendar, education management systems to communicate with schools, pupils and parents)
Video	Watching instructional videos and/or audios (e.g. online library)
CreVid	Creating and broadcasting videos and/or audios (e.g. YouTube)
Txt	Sharing and exchanging of documents and text messages, for example, by email or websites or social media (e.g. Facebook, Whatsapp)

The given options for frequency that could have been answered were: *never, once a week, three times a week, every day.*

The distribution of answers in percentage are given in Table 2. With bold font are presented the highest frequencies for each of the tools/approaches.

Table 2.

Frequency in usage of digital tool/approach in percent

%	Virtual	Synch	Shdo	Shscr	Brain	Plan	Video	CreVid	Txt
never	6.9	6.5	20.2	9.0	22.3	6.7	21.2	35.3	4.8
once a week	23.5	33.0	36.1	26.3	47.7	42.9	44.5	36.3	32.1
3 times a week	4.8	12.2	12.4	11.6	17.6	13.5	15.8	13.9	11.6
every day	64.9	48.3	31.3	53.1	12.4	36.8	18.5	14.5	51.5

As this survey was an on-line survey it only accesses responses of teachers that are already using digital technologies. There might exist teachers that do not feel very confident with technologies due to various reasons. As a result,

they might have decided not to fill in the tool. Hence, the responses from least technology proficient users are most probably missing. This should be researched further and see if the

answers from all teachers will support received findings in this survey.

However, from the analysis of the received answers, it can be seen that all suggested tools/approaches were used. The highest frequency of usage received the approach

Virtual classroom software (65% used it on a daily basis), followed by *Screen Sharing* (53% used it on a daily basis) and *Sharing documents and text messages* (51.5% on a daily basis). It is positive to see that more than

half of all respondents were using at least these approaches every day. Combination of these three approaches can cover a lot of different activities for all subjects. The least used was *Creation Videos* (the biggest percentage of 36% used it only once a week) and *Sharing documents through cloud services* (the biggest percentage of 36% used it once a week). Some future research should focus on reasons why these approaches received smallest frequency of usage.

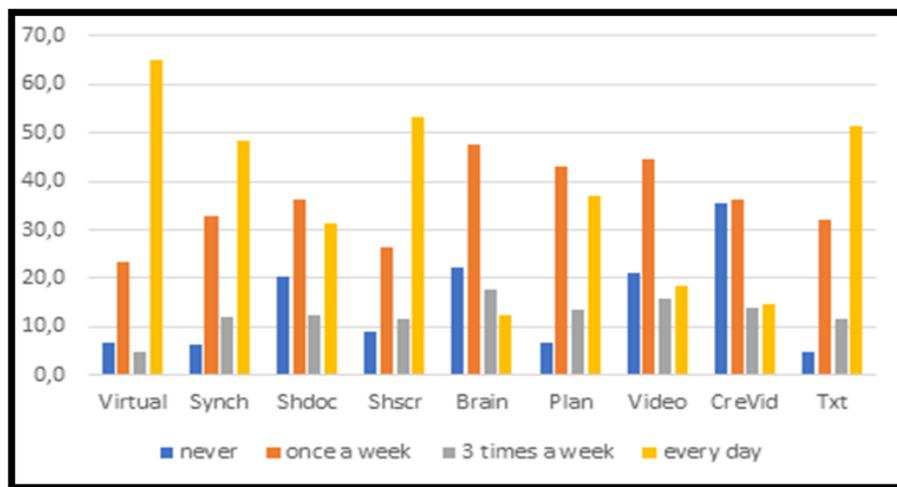


Figure 1.
Frequency of use of different digital tools/activities during the Covid-19 lockdown by the total Macedonian sample.

The following cross-tabulation is researching and analysing if there is a difference in these results in different age groups of respondents

and the subject they are teaching. Table 3 is presenting the distribution of all respondents based on their age.

Table 3.

Distribution of respondents in age groups

Age range (years)	
Under 25	1
25-29	38
30-39	150
40-49	161
50-59	144
60 or more	20
Prefer not to say	10

The following table is cross-tabulating the age of the respondents with the frequency of their usage of different digital approaches/tools.

Table 4.
Distribution of frequency of usage of digital tools/approaches among age groups

%	Virtual	Synch	Shdoc	Shscr	Brain	Plan	Video	CreVid	Txt	
25-29	2.6	5.3	13.2	18.4	31.6	10.5	21.1	26.3	2.6	never
	21.1	39.5	55.3	28.9	39.5	44.7	34.2	39.5	52.6	once a week
	2.6	5.3	7.9	5.3	21.1	10.5	31.6	18.4	5.3	3 tms/ week
	73.7	50.0	23.7	47.4	7.9	34.2	13.2	15.8	39.5	every day
30-39	8.7	5.3	16.7	7.3	15.3	4.0	15.3	32.7	5.3	never
	26.7	35.3	37.3	31.3	46.7	44.7	46.7	40.0	33.3	once a week
	7.3	11.3	12.0	12.0	20.0	16.0	19.3	14.7	11.3	3 tms/ week
	57.3	48.0	34.0	49.3	18.0	35.3	18.7	12.7	50.0	every day
40-49	6.8	4.3	17.4	9.3	22.4	7.5	20.5	34.2	1.9	never
	21.1	33.5	34.2	22.4	47.2	39.8	46.0	35.4	28.6	once a week
	3.7	13.0	13.7	11.8	18.6	16.1	14.9	14.3	12.4	3 tms/ week
	68.3	49.1	34.8	56.5	11.8	36.6	18.6	16.1	57.1	every day
50-59	5.6	9.0	27.1	8.3	25.7	7.6	26.4	38.9	8.3	never
	22.2	27.8	31.9	24.3	52.1	41.0	45.1	36.1	30.6	once a week
	3.5	13.9	13.2	13.9	13.2	10.4	9.7	12.5	9.0	3 tms/ week
	68.8	49.3	27.8	53.5	9.0	41.0	18.8	12.5	52.1	every day
60 or more	10.0	5.0	20.0	10.0	10.0	0.0	25.0	60.0	0.0	never
	30.0	35.0	30.0	30.0	65.0	60.0	45.0	20.0	20.0	once a week
	5.0	10.0	10.0	0.0	15.0	5.0	15.0	5.0	35.0	3 tms/ week
	55.0	50.0	40.0	60.0	10.0	35.0	15.0	15.0	45.0	every day

Bold font is used in Table 4 to stress the highest percentage for each age group and each digital tool/approach used during online teaching.

The Table 5 is presenting only the highest percentage of usage in the respective age group. To make it even more visual the following colour coding was used for frequency of usage.

never
once a week
three times a week
every day

Table 5.

Distribution of highest frequencies of use of digital tools/approaches among age groups

Age	Virtual	Synch	Shdoc	Shscr	Brain	Plan	Video	CreVid	Txt
25-29	73.7	50.0	55.3	47.4	39.5	44.7	34.2	39.5	52.6
30-39	57.3	48.0	37.3	49.3	46.7	44.7	46.7	40.0	50.0
40-49	68.3	49.1	34.8	56.5	47.2	39.8	46.0	35.4	57.1
50-59	68.8	49.3	31.9	53.5	52.1	41.0	45.1	38.9	52.1
>= 60	55.0	50.0	40.0	60.0	65.0	60.0	45.0	60.0	45.0

It is evident that majority of tools/approaches that were used are either on a daily basis or once a week.

Only older teachers (50+ years) have never used *Creating videos* as approach. There can be several reasons why this result occurs: they are not prepared to use the adequate software, they cannot use the equipment for creating videos, or maybe they do not know how and when to use videos in the online environment.

Unexpected finding is that the bigger number of green cells (answers "every day") for highest frequencies of usage of digital tools/approaches appears in row for relatively older age groups (40+ years old). That means

that older teachers were using bigger variety of tools/approaches on a daily basis. The researcher has expected such result from younger teachers.

The following part is researching if there is a connection between the subjects taught and digital tools/approaches used. The majority of responses were received from teachers who teach general academic subjects in both general and vocational schools, which can be seen in Table 6. It is important to recognise that "general academic" subjects are also taught in VET schools, that is why this number is significantly bigger.

Table 6.

Distribution of respondents according to taught subject

Type of subject mainly taught	
General academic	315
Vocational or professional	143
Other	66

There are some respondents that have selected "Other" for the type of subject taught. These are the teachers teaching art, sports and supporting staff like school psychologist or

pedagogue, who generally do not teach. In the cross-tabulating Table 7, percentages were used so that findings could be comparable.

Table 7.

Distribution of frequency of use of digital tools/approaches among taught subjects

%	Virtu.	Synch	Shdoc	Shscr	Brain	Plan	Video	CreVi	Txt	
General Academic	8.3	6.1	21.7	6.7	19.1	5.1	21.3	36.9	5.4	never
	21.7	31.8	34.7	27.7	50.6	43.0	44.6	38.5	31.2	1/ week
	5.1	12.7	12.1	10.2	18.5	14.0	16.9	12.1	10.2	3 tms/ week
	65.0	49.4	31.5	55.4	11.8	37.9	17.2	12.4	53.2	every day
Vocational	5.6	8.4	18.9	10.5	23.8	9.1	25.2	36.4	3.5	never
	21.7	28.0	36.4	22.4	46.9	37.1	38.5	32.2	28.7	1/ week
	3.5	12.6	11.9	9.1	16.1	14.7	14.0	14.7	11.9	3 tms/ week
	69.2	51.0	32.9	58.0	13.3	39.2	22.4	16.8	55.9	every day
Other	3.0	4.5	16.7	16.7	33.3	9.1	12.1	25.8	4.5	never
	34.8	48.5	40.9	27.3	36.4	54.5	56.1	33.3	42.4	1/ week
	6.1	9.1	15.2	24.2	16.7	9.1	15.2	21.2	18.2	3 tms/ week
	56.1	37.9	27.3	31.8	13.6	27.3	16.7	19.7	34.8	every day

The highest percentage of responses in each subject group and for each tool or approach are stressed with bold font. To present this with an easier visual, colour scheme is introduced (presented on the previous pages).

Table 8 is presenting only the highest frequencies for each tools/approach in each subject group. From Table 8 it is visible that most of the tools/approaches were used only once a week.

Table 8.

Distribution of highest frequencies of use of digital tools/approaches among taught subjects

Subjects taught	Virtual	Synch	Shdoc	Shscr	Brain	Plan	Video	CreVid	Txt
General Academic	65.0	49.4	34.7	55.4	50.6	43.0	44.6	38.5	53.2
Vocational	69.2	51.0	36.4	58.0	46.9	39.2	38.5	36.4	55.9
Other	56.1	48.5	40.9	31.8	36.4	54.5	56.1	33.3	42.4

Virtual classroom software has been most widely used, closely followed by *Screen sharing*. Having in mind that Macedonian Ministry has prepared a national platform that supports these approaches, this finding is expected. Unexpected is big usage of *Sharing documents and text messages* outside the

national platform (for example WhatsApp or Facebook).

The only dominant answer “never” is by VET teachers on *Creating video*.

VET teachers have the biggest number of green cells (answers “every day”). This means that VET teachers used bigger variety of

different digital approaches and tools. As ETF researches in 2020 have found that current generations of learners face a greater risk of losing interest in and motivation to study, it is of most importance to use variety of digital approaches and tools in order to keep them

Conclusions

Macedonian teachers have been using from 3 to 5 different digital tools and approaches during online teaching because of Covid-19. The preferred tools are *Virtual classroom software*, *Synchronous video-communication tools* and *Sharing documents and text messages*. The least used are *Creating Videos* and *Presenting videos*. It should be further

engaged and interested. The experiences from VET teachers should be disseminated across other teachers too, to support them in engaging different digital tools and approaches.

researched why. VET teachers have used the biggest variety of digital tools and approaches on a daily basis. Their experience should be disseminated to other teachers. Younger teachers are using smaller number of different tools/approaches compared with older teachers. The cross-age interactions should be empowered in order to use the best from both age groups.

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