

# Use of mathematics and physics teachers' resources during and post Covid-19 pandemic

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## 1 Introduction

During the global pandemic an approach to teaching, lesson planning and classroom preparation had to be adjusted. On one hand online teaching made it impossible to use conventional methods teachers were used to employ in their math and physics classes. On the other hand, the online environment offered several new and exciting opportunities to explore. Lots of previously not that frequently used online, or offline applications and websites started to get recognized and used. Many new materials of all kinds were created by teachers and shared online (e.g. in teacher groups on Facebook, online libraries, websites for teachers, etc.). The amount of online videos (YouTube, Khan Academy, etc.) surged and views of instructional or educational videos for all grades increased as well.

This unexpected and sudden appearance of new resources caught our attention. We were interested in ways in which mathematics and physics teachers' use of resources has changed due to the Covid-19 outbreak. In accordance with Winter et al. (2021) we expected increase in the use of technology and new software environments during the pandemic. However, we were also interested if teachers still use some of these resources post Covid-19 as several studies (such as Chinnathambi et al. (2021)) suggest positive impact of online resources on learning and recommend using these practices even post Covid-19.

## 2 Methodology

We conducted a research among primary, lower and upper secondary school mathematics teachers from different countries participating in the Horizon 2020 project MaTeK. In a research one of the questions asked the teachers if there are any changes in their use of resources caused by Covid-19. Countries involved in that project are as follows: Slovakia, Czech Republic, Italy, Norway, and Turkey. We have also conducted several interviews with participating teachers. Most teachers agreed that their usage of resources was greatly influenced by lockdown and offered several examples. These

preliminary results served us as a basis for a new questionnaire we developed as we wanted to deeper analyse impacts of Covid-19 on the use of resources in both – math and physics classes. This new questionnaire was developed with specifics of Slovak and Czech school systems in mind. We decided to focus on these two countries as our school systems are close to each other as we share common history and the results might be compatible (see Slavičková and Novotná, 2022). Purpose of this questionnaire is to find answers to the following research questions:

- RQ1: Which methods did teachers find useful and working for pupils during the lockdown?
- RQ2: What changed in teachers' use of resources during and after the lockdown?
- RQ3: Do teachers still use new methods or approaches from RQ1 now? If so when, why and for what?

Questionnaire comprised two parts: First, teachers indicated what subjects they teach and based on that they answered questions about mathematics, physics, or both. These questions were either open, semi-open or closed. Teachers were asked about their use of resources pre-, during and post-lockdown. They were to select which resources they used when and state what for and why. Second part consisted of demographic questions.

### 3 Results and conclusions

From the preliminary results of questionnaires and the interviews with several teachers of mathematics or physics we observed many similar trends among teachers of the same country and some differences among teachers from different countries.

For instance, the most used resources before lockdown in both countries and subjects were *textbooks*, *discussions with colleagues* and *other books about the subject*. On the other hand, teachers did not usually use *online resources* or *journals*. During the lockdown all the teachers frequently used *digital applications* (such as *GeoGebra*, *WolframAlpha*, etc.). The greatest surge in comparison to pre-lockdown situation was present in *online video resources* (such as *YouTube*). There was also increase in the use of *general information websites* and *professional online platforms / libraries for teachers* as expected. Other use of resources remained similar to pre-lockdown situation. Several teachers responded that they only tried these online resources but did not use them frequently during the lockdown. We were also interested in resources that teachers discovered during the lockdown and do still use them nowadays. Results suggest that teachers still use *digital applications*, *online video resources* and *website where teachers can share their materials with others*.

Interviews with teachers should help us to better understand their preferences in the resources used and reasons why they either do or do not use given resources after the lockdown ended. Results of this study are to be shared and discussed with pre-service teachers of mathematics and physics as part of their university preparation.

## References

1. Winter, E., Costello, A., O'Brien, M., & Hickey, G. (2021). Teachers' use of technology and the impact of Covid-19. *Irish Educational Studies*, 40(2), 235-246.
2. Chinnathambi, D. K., Anandan, M. L., & Bharathi, D. B. T. (2021). Teachers' Perception of Online Teaching during Covid-19: A study at UTAS-Ibra, Oman. *Journal of University of Shanghai for Science and Technology*, 23(06), 91-107.
3. Slavičková, M., & Novotná, J. (2022). Possible approaches for the pre-service mathematics teacher's preparation to apply the digital technology in their own teaching, Proceeding of CERME 12 [accepted]