Chapter 31
E-Learning When Pandemic Endangers Human Population: Case Studies of Bosnia and Herzegovina and Austria

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31.1 Introduction

We have provided here two case studies: one is in the country of Bosnia and Herzegovina, and another case study is in Austria, which is a member of the European Union. The goal of these case studies is to provide comparison of two countries’ implementation of educational system when the society is being affected by a serious, unexpected, and dangerous situation requiring immediate action in order to provide an undisturbed process in education.

Bosnia and Herzegovina has been relatively a new country in terms of being recognized from the United Nations, came out of the civil war after 30 years, and still despite of some obstacles in political and organizational life has managed to find a way to provide their students and pupils a well-organized e-learning or distance learning system, which has provided a great feedback.

Another case study country is Austria, a really well-organized and stable country and a member of the European Union that has found a good way on how to rise up to the challenge of introducing distance learning system in the extraordinary time.

The goal of this paper is to provide results of this research and contribute to the educational society in providing a resource of successful implementation in two different countries, showing the weaknesses and strengths in planning and the implementation of e-learning systems.
31.2 Case Study Austria

When the COVID-19 pandemic has reached Austria, the whole society was unprepared for this sort of pandemic attack on human population. As first it wasn’t expected, like in the rest of the world, how it spreads and how it affects people’s health, the Austria government was first to implement “shutting down” of institutions, companies, and every other aspect of possible human contact that could prevent the spread of the virus and with this approach tried to save as many lives as possible.

This has influenced the schools as well, as there was no feasible solution at that moment on how the schooling and education will continue. But before going more in detail about technology being used, we have provided a number of pupils/students in Austria (Table 31.1).

We must mention that there is difference between Austria and Bosnia and Herzegovina in the schooling system, as the former’s elementary school last only from first to fourth grade and then it is separated into two secondary school levels called lower and higher degree of secondary school, while the latter’s lasts from first grade to eighth grade, and the secondary school has 3 or 4 years in total, depending on the type of the school (i.e., gymnasium, technical school, etc.).

After the pandemic breakout and the few days of no school activities, the approach was to introduce the e-learning in schools and universities. There was certain freedom in choosing the technologies from educational institutions, as they would then know how their staff and pupils will adjust to the technologies. In most cases, there was a combination of different technologies, for example, web mash-up [1], but also extending to mobile technology, as this could give more creativity in fulfilling the daily school activities (Table 31.2).

The list of technologies was added “on the fly,” or it was adjusted in short period starting with e-learning processes. As in Austria, as mentioned previously, children age from 6 to 10 (one to four classes) attend elementary schools, and as these children at these age are pretty familiar with mobile devices, it was decided to use the

| Country (Burgenland) | Number of pupils in elementary schools | Number of pupils in secondary schools |
|----------------------|----------------------------------------|--------------------------------------|
| Burgenland           | 10.588                                 | 33.199                               |
| Kärnten              | 20.741                                 | 67.082                               |
| Niederösterreich     | 65.062                                 | 202.319                              |
| Oberösterreich       | 61.211                                 | 175.832                              |
| Salzburg             | 21.487                                 | 67.107                               |
| Steiermark           | 44.574                                 | 156.803                              |
| Tirol                | 28.963                                 | 96.883                               |
| Vorarlberg           | 16.824                                 | 45.895                               |
| Wien                 | 72.942                                 | 279.876                              |
| **Total**            | **342.392**                            | **1.124.996**                        |
Anton App [2], co-funded by the European Union, which covers the daily practices in teaching and exercises. This application has a separated teacher and pupils’ accounts, where each teacher can monitor the progress of its pupil. The organization of the app itself is the same as in the classes, so it perfectly represents that certain school activity that is being represented in the online form.

For the communication aspect, the technology being used is Skype and Signal App, where it was used for virtual classes and all the pupils and teachers can see each other, have a conversation about school subjects and activities, and also fill in the social gap of at least seeing each other and keeping the team spirit. For paperwork and lessons, when required, it was sent by the email clients (Gmail, Outlook, etc.) depending on the parent and teachers’ setting. This way, it bridged the gap with needed exercises or lessons; however, there could be a need for these kinds of documents to be printed out, and this could cause an issue to parents who do not possess printer in-house.

In the secondary schools, of course, the technologies used in e-learning processes are also adjusted to the pupil’s knowledge and known usage of software solutions and devices (Table 31.3).

Microsoft teams for education was chosen as it has a structure easy to implement, for example, processes are in classes, where teacher has a direct communication channel with students and also there are collaboration channels for exchanging documents with teacher and students. This way everything is centralized, and there is history of events, including storage for documents. There is option for students to use software like Word for text processing with no cost for students, and everything, including email client, is already loaded in the browser and on one place. This way, teachers and students have all the necessary activities in grasp, which help knowledge to be transferred and assessed.

For communication between teachers and parents, depending on the teacher, there is option to use WebEx, in most cases, where videoconferences are being held and information is being exchanged and communicated.

| Table 31.2 Technologies chosen in elementary schools for e-learning processes |
|-----------------|-----------------|
| Technology      | Type            |
| Anton App       | Mobile application |
| Skype           | Mobile/desktop application |
| Signal App      | Mobile application |
| Email           | Email clients   |

| Table 31.3 Technologies chosen in secondary/gymnasiums schools for e-learning processes |
|-----------------|-----------------|
| Components      | Type            |
| Office 365/Microsoft Teams School | Cloud software for collaboration and communication for schools |
| WebEx Cisco     | Mobile/desktop communication application |
| Email           | Email client   |
For the written communication between parents and teachers, email client is being used, depending on their own preferences [3].

In Austria, projects in e-learning have been successfully implemented before, like the FMS and the Academy for New Media in the Transfer of Knowledge (ANMKT) (University of Graz), “Developing an e-learning module for the educational needs” (2011–2012) [2], and the educational society had a quite good experience with them.

### 31.3 Case Study Bosnia and Herzegovina

In Bosnia and Herzegovina, the pandemic was unexpected in the form as it has appeared; however, especially after seeing how the situation started in Italy, the government, especially in the Republic of Srpska, has responded immediately and implemented “shutting down” of public life, companies, and every other form of contact between people. Companies were instructed, where possible, to start with remote work or home office. This was analyzed and estimated to be feasible and implemented for educational schools and universities. In Bosnia and Herzegovina, as is the case in Austria, elementary schools and secondary schools were using a combination of technologies accommodated to the age of pupils and their knowledge of certain technologies. To acknowledge better how many pupils/students were required to accommodate the distance learning, here we have provided the official statistics to better illustrate the learning process of the Federation of Bosnia and Herzegovina [5] and the Republic of Srpska [4] (Tables 31.4 and 31.5).

Schools implemented various technologies based on the knowledge of pupils in certain classes. In elementary schools, Microsoft Teams for collaboration were used, and depending on teachers, Viber Groups was also used, as Viber is a popular

| Kanton                | Number of pupils in elementary schools | Number of pupils in secondary schools |
|-----------------------|----------------------------------------|---------------------------------------|
| Una-Sana              | 20.873                                 | 8.746                                 |
| Posavina              | 2.134                                  | 1.094                                 |
| Tuzla                 | 39.267                                 | 15.867                                |
| Zenica-Doboj          | 31.223                                 | 11.606                                |
| Bosnian-Podrinje      | 1.886                                  | 903                                   |
| Central Bosnia        | 22.328                                 | 8.464                                 |
| Herzegovina-Neretva   | 17.549                                 | 7.260                                 |
| West Herzegovina      | 7.841                                  | 3.570                                 |
| Sarajevo Canton       | 36.957                                 | 16.111                                |
| Canton 10             | 4.411                                  | 1.967                                 |
| **Total**             | **184.469**                            | **75.588**                            |
communication application in Bosnia and Herzegovina, as well as WebEx. Also, the remote teaching over public television broadcast was implemented, where the daily schedule was published on the Ministry of Education web portal. Schools have communicated on their web sites what the teacher has presented on official YouTube channel lessons, including content of lesson being presented and eventual exercises that followed certain lessons (Table 31.6).

Secondary schools have mostly implemented e-learning platforms such as Moodle, where all the lessons and test exercises have been accessed by the previously authorized pupils/students. The identity management [6] was also a focus in these e-learning systems, where it was controlled, organized, and followed up which student was and when logged into the e-learning system, so that tracking of participation could be followed as it would be in normal school time (Table 31.7).

As structure of Bosnia and Herzegovina is of two main entities or republics, it could vary the use of the abovementioned technologies, depending on the official authorities’ recommendation and help that was provided from these governments. However, the knowledge sharing was intensive including best practices that have been proven helpful [7].

### 31.4 Conclusion

We have seen in this science papers that both countries, Austria and Bosnia and Herzegovina, even though surprised with the pandemic wave that has brought lockdown to societies as a whole, have made a terrific effort and great job in providing and organizing education to the pupils and students, without or with little loss of the
quality of provided teaching and knowledge. It has also shown in this time, where human population was endangered across the entire planet, education was not stopped nor paused. Teachers together with their pupils and students have managed to use cloud technologies and Internet applications in the most effective way, which usually in large IT companies would require significant resources of IT experts to make everything work with no issues. This comes to prove that no matter how economically strong or less strong a certain country is, as stated for these two countries, cloud and Internet technologies will overcome this factor and will provide a global bound to human population, with a focus of making our societies generate knowledge that will benefit all of us.

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