Impact of Distance Learning on Motivation and Success Rate of Students During the COVID-19 Pandemic

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Abstract – COVID-19 pandemic has created a whole new set of challenges in all aspects and fields of education. Teachers and professors had to quickly implement online teaching procedures and use various tools for online communication and collaboration. Although this kind of teaching has been used at some universities, for many professors and teaching professionals this kind of approach was something completely new. But, it was not only new for the teachers, it was also new for the students. In this paper, an overview of challenges that are related to online education process is presented and elaborated. The research results about the impact of distance learning on motivation and success rate of students are also given and discussed.

Keywords – COVID-19, online education, distance learning, teachers, students, challenges, motivation, success rate

I. INTRODUCTION

COVID-19 pandemic has introduced a number of new challenges in the education system that teachers and professors had to deal with quickly and effectively. Distance learning has suddenly become the main way of educating students. And although distance learning was a common practice at some universities, for the majority of education professionals this kind of teaching was something completely new and unfamiliar. Because of this, a quick and effective response was required. Universities have organized various forms of online support and education for their teachers, and teachers have made additional effort to react quickly.

However, many teachers have experienced a number of challenges. Some of these challenges have been dealt by the universities’ support staff and some have been left to the teachers. In general, most of the teachers succeeded to quickly adapt and provide the students with a suitable distance learning materials and teaching methods. In this paper, an overview of challenges that have emerged regarding distance learning are presented and elaborated.

Another important aspect of distance learning is student motivation and success rate since students have found themselves in a completely new learning environment. Distance learning has made students somewhat less connected with their colleagues, but it has also enabled them to save traveling time and to work from the comfort of their homes. Students also had to do more self-management and had to organize their work. In this paper, the research results about the impact of distance learning on students’ motivation and their success rate are presented and discussed.

II. DISTANCE LEARNING AND STUDENT MOTIVATION

COVID-19 pandemic has greatly affected the education system [1; 2; 3; 4]. A number of challenges have been put in front of universities, schools and teachers.

Existing research has shown a number of issues that have been identified [4]:

- Richer countries can access online education easily with the efforts of students and teachers but it is difficult for the developing or under developed countries to provide online education smoothly.
- Many students do not have laptop, mobile or Internet connectivity at home due to which it is difficult to attend online class.
- Spending long hours on laptops or mobile phones can lead to a cause of stress for teachers as well as students.
- Schools or colleges not only provide learning to the students but facilitate the students for other curricular activities and make them socially active.
- Long period disengagement of students with the schools and colleges can lead to increase in dropout rates.
- Classroom learning is preferred more over the online learning as classroom learning ensures more involvement of students.
- This pandemic has also effects on the employment rate as due to slow down of the economy there may be decrease in the rate of job offers.
- Students feel less motivated to attend online class as there may be no proper environment of study at home so only motivated students can benefit from the courses.
- Students are confused about their next steps as board exams, competitive exams, internships and trainings are cancelled during this time.
- Students are responsible for their learning during online learning.

In order to deal with the identified issues several steps have been proposed as a part of existing research [4]:

- Education ministries may understand the challenges faced by the students regarding Internet connectivity, computers, etc.
- T.V. and radio are the powerful tools which can be used to provide education to different sectors. The content may be delivered through these tools and teachers or students may contact with each other through social media such as WhatsApp, Facebook or SMS.
- Parents should support the children in studies as now parents have to play active role in the studies of the children.
- E-learning must be combined with classroom learning so as to take the best advantage of this combination.
- Measures should be taken to mitigate the effect of pandemic on the job offers and employment rate.

Online education is just one of several possible educational methodologies but it has practically overnight become the main way of providing education. The main educational methodologies are [5]:

- The traditional classroom education, where books and blackboards are used by the teacher as a teaching aid.
- Modern classroom education, where the classrooms are equipped with whiteboards, projectors or audio-visual display equipment and digital boards.
- Online education, where the information technologies and communications are used to help in the development and acquisition of knowledge from the different remote locations. It uses the Internet, video/audio and text communication, and software to create the learning environment.

When talking about online education then several types of online learning can be mentioned [5]:

- Knowledgebase
- Online support
- Asynchronous training
- Synchronous training
- Hybrid training

Knowledgebase type refers to lessons and other materials that are made available online. However, there is no online support from the teachers. Online support adds this kind of support to students via forums, e-mails or other communication channels. Asynchronous training refers to a form of education where lectures are prerecorded and made available online. Teachers also communicate with students on a regular basis. Synchronous training includes lectures in real time with live teachers support. Hybrid training combines online and live in-person education.

III. STUDENT SUCCESS RATE

Student motivation is a critical factor in overall student success rate [6]. Since students have to do more self-management in distance learning environment their motivation to learn has become even more important factor.

In order to support and increase students’ motivation to learn in online learning environment it is very important to take appropriate steps and include necessary elements. One of the steps is to explain precisely and clearly what is the goal of a particular assignment. This includes the following [7; 8]:

- Explain to students why the task is important and interesting to them. It may be useful to link the task to practices that the students may use in their professional life.
- Define the learning objective of the task. Such objectives will identify the performance standards that a student needs to meet to reach the desired goal.
- Give advice in relation to the time required to complete the activity.
- Provide preliminary exercises that the students can practice, thereby building their confidence and boosting their motivation.

It is well known that intrinsic motivation is one of the crucial factors of success and this is also true in the case of online learning [9; 10; 11; 12; 13].

Another factor that can foster better focus of students is the feeling that other students are present in an online environment [14].

Research has shown that teachers’ role is important in both offline and online education environment, especially regarding the motivation of students to learn and self-regulate their learning efforts [15]. In other words, the teachers’ role does not end with supporting students in their assignments, course matter comprehension, and collaboration activities using appropriate technology, but continues with supporting and engaging students in order to boost their motivation to learn and achieve new goals.

Many research results have found that the quality and quantity of students’ interaction and their satisfaction with the learning experience is promoted by teachers’ presence and feedback, teaching efforts and encouraging collaboration [16; 17; 18; 19]. Students tend to value the flexibility of online education [19], however professor and teachers in many cases find challenging to address all learning styles and individual learning needs of each particular student [20]. One of more important demotivation factors is the isolation and anonymousness of each student [19].

There are many online communication tools that can be used for the purpose of distance learning. Some of the more know tools are:

- Zoom
- Webex
- BlueJeans
• Google Meet
• Microsoft Teams
• Adobe Connect
• BigBlueButton
• Jitsi

In order to select the most appropriate tool several factors have to be taken into consideration such as: the number of participants, audio and video quality, latency, complexity of the user interface, pricing, additional features, etc.

IV. METHODOLOGY AND RESEARCH RESULTS

In the continuation of this paper, the research results about the impact of distance learning on student motivation and success rate are presented and discussed. The research has been conducted among the first-year students of information technology study program during the distance education about programming (on the course Programming 1).

As soon as the COVID-19 pandemic began, the preparations for distance learning have started since it was the intention of the teachers to provide students with as similar experience compared to in-person education as possible. A number of tools have been analyzed and in the end Zoom has been selected as the tool that will be used in distance synchronous education. During the semester, Zoom has been used for lectures and individual or group consultations. The testing has been implemented by using own developed web system PTG (Programming Tasks Generator) [21; 22]. PTG is shown in Fig. 1.

![Figure 1. Web system PTG](image)

Web system PTG enables individual generation of programming tasks for each student in a way that each student gets individual set of tasks. The system is available to students in discrete time slots and there is a limited time in which students have to submit the source code of solved programming tasks.

All asynchronous activities have been supported by the open-source learning management system Moodle (lecture materials, program examples, notifications and forum).

Theoretical tests have been created in the learning management system Moodle by following several principles that have been identified as important in online learning environment in order to get as objective results as possible:

- Limited testing time
- Limited time slots for each question
- Answering question by question without the possibility to go back
- Disabled copying of the content

Since part of the course was held in-person students were able to compare in-person lectures and course activities with distance learning education. To conclude about the quality of conducted distance learning students were asked to participate in the research via provided questionnaire (questionnaire items are shown in Table I). More than half of first-year students of information technology study program taking the course about programming have participated in the research (132 students). The research was conducted using an online questionnaire in which all possible answers except the first one were based on the Likert scale with possible responses ranging from “Strongly disagree” (1) to “Strongly agree” (5). Research results are shown in Table I.

<table>
<thead>
<tr>
<th>Questionnaire item</th>
<th>Mean</th>
<th>Std. dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to classical teaching, I consider distance learning:</td>
<td>3,69</td>
<td>0,91</td>
</tr>
<tr>
<td>1. To be of much lower quality and much less interesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. To be of lower quality and less interesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. To be of the same quality and equally interesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. To be of higher quality and more interesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. To be of much higher quality and much more interesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The course content presented to me via distance learning was understandable to me</td>
<td>4,21</td>
<td>0,87</td>
</tr>
<tr>
<td>During the distance lectures, interaction with students was achieved.</td>
<td>4,62</td>
<td>0,62</td>
</tr>
<tr>
<td>I find the technology chosen for distance learning to be interesting and of high quality</td>
<td>4,37</td>
<td>0,78</td>
</tr>
<tr>
<td>Distance learning has increased my motivation to learn the course content.</td>
<td>3,55</td>
<td>1,29</td>
</tr>
<tr>
<td>What grade would you give to the course teacher?</td>
<td>4,40</td>
<td>0,74</td>
</tr>
<tr>
<td>I want a part of the course to be organized via distance learning in the following academic years.</td>
<td>4,10</td>
<td>1,23</td>
</tr>
</tbody>
</table>

Research results have shown that students are satisfied with provided distance learning education and that they perceive it to be of similar and even slightly higher quality, as well as a bit more interesting, than classical in-person teaching. It was shown that presented course content was understandable to students, that necessary level of interaction was achieved and that used technology was chosen well. The teacher has been given high grades.
by the students. This has shown that the way of teaching
and interacting with students was organized and
implemented well. Majority of students have stated
that they would like to continue with distance learning in
the following academic years.

The last aspect that was researched was the motivation
of students. Research results have shown that the
motivation of students to learn has increased in majority
of the students. However, there are also students who
simply prefer face-to-face communication and teaching.
This is also reflected in standard deviation value.

All mentioned conclusions have also been confirmed
by analysis of the comments that have been gathered from
the students in the research process. Several student
comments are given below:

• “Despite the unfortunate events that befell us, I
believe that distance learning was the best possible
solution that does not differ so much from classical
teaching. The content is presented to us in the same
way as if we were physically present in the lecture
room, only we can follow the lectures from the
comfort of our home.”

• “I think that the lectures of the course Programming I
are an example of what distance learning should look
like. I also think that this way of teaching encourages
greater activity of students in lectures.”

• “The technology and applications that are used are
great but I think there are too many different
applications used across all the courses (I think there
should only be one or two applications that are used
on all courses). I absolutely agree that this kind of
Teaching increases my motivation to learn, although I
don't exactly know why.”

• “It is easier for me to understand the course materials
via online teaching.”

• “To begin with, I must commend the efforts to keep
classes at a decent level despite the current situation. I
think part of the teaching can be organized remotely
without any problems. The current situation has
forced me to work more for this course and I am
currently more successful.”

• “Distance learning is a very good way to replace the
classical teaching, and over time it seems to me to be
better than teaching in normal circumstances.”

• “I am very satisfied with this way of teaching because
I am much more concentrated than in a classic indoor
lecture room. I absorb the course material more easily
and I think it is a better way of teaching.”

• “Much easier and more flexible way of following the
lectures, equal quality and greater attendance rate that
can sometimes raise the quality of teaching by
ensuring answers to additional questions or
ambiguities that students may not take into account as
much. All in all, better and easier :)

• “I really like distance learning because those who
don't want to follow the lectures don't bother me.”

• “All is well! Classes are very close to their live
version.”

• “Excellent lectures, I hope that such way of teaching
will be present in the future as well.”

Regarding the student success rate in the distance
learning environment, the results of the final practical and
theoretical testing have been analyzed. The most
demanding part of overall testing was the practical part
that was conducted via web system PTG. Students have
been given 4 programming tasks and they could be given
from 0 to 20 points depending on their submitted
programming solutions. Average number of points in the
practical part of testing was 13,89 with standard deviation
of 4,27. Distribution of points in the practical part of
testing is shown in Fig. 2.

In the theoretical part of testing students could be
given from 0 to 14 points on the first test and from 0 to 16
points on the second test. The average number of points
on the first test was 7,60 with standard deviation of 3,62
and 11,61 on the second test, with standard deviation of
3,37.

Based on the presented testing results it can be
concluded that distance learning has been conducted
successfully, that student success rate was good, and that
distribution and averages of gained points were mostly in
the expected or slightly better range.

Many students have shown slightly better knowledge
and skills than expected and this shows that even the
programming courses that are known to be hard to teach
and learn [23; 24] can be taught via distance learning in
high-quality and pedagogically sound manner.

V. CONCLUSION

COVID-19 pandemic has created a number of
challenges for universities, schools and other educational
institutions. By quick reaction, a number of available
technological solutions, and by additional effort new
teaching models have been implemented. Overview of
mentioned challenges has been presented in this paper,
along with the overview of factors that can affect student
motivation and success rate.

Research results regarding programming course that
has been conducted via distance learning have been
presented and discussed. The results have shown that

Figure 2. Distribution of points in the practical part of testing

Conclusions have also been confirmed by the comments
that have been gathered from the students in the research
process.
students have perceived online programming course and distance learning as something interesting and that the course content has been presented in understandable and clear manner. Students’ motivation to learn has also been slightly increased and they stated that distance learning is something they would like to be present in the future teaching activities. Students have graded their teacher with high grades and they have stated that the interaction was achieved in a way that is useful to students via interesting and easy-to-use communication tools.

Students’ success rate has also been achieved at a level that would be expected, and even a slightly higher knowledge and skill level has been acquired and demonstrated by many students.

It can be concluded that distance learning can be conducted in an organized, effective and pedagogically sound manner, even in the case of programming courses that are known to be hard to teach and learn.

REFERENCES


