The Lockdown Impact on Students' Successfulness

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Abstract. COVID-19 presented traditional higher education institutions with challenges that most did not meet. Unpredicted lockdown forced them to move all pedagogical processes online overnight. Institutions and academics with some online teaching experiences transited more smoothly than others. Many researchers mainly reported the negative impact of the lockdown on students' well-being and achievements. In the paper, we present a case of how lockdown could be an excellent opportunity to improve students' success and reach goals that were unreachable before. Business Informatics was a hard nut for business students for years, and teachers did not know how to deal with it. Adapting course learning design to lockdown situations, wise use of existing digital (and non-digital) technologies, interactive and supportive learning environments significantly improve course accomplishment rates.

Keywords: Higher education · COVID-19 · Students' successfulness · Course learning design · Online learning

1 Introduction

The SARS-CoV-2 virus, which caused COVID-19, exploded in Wuhan (China) at the end of 2019 [10]. Globalisation caused the virus to spread quickly worldwide and caused lockdowns in different countries [1, 4]. As of the end of January 2020, the virus has been found in EU countries (France, Finland, Italy, Spain, etc.) [13]. Northern Italy, especially Bergamo, has been severely affected [9]. University of Primorska (UP) is only 20 km away from Italy, 400 km from Bergamo; for this reason, the university transferred all teaching activity online on March 9th, 2020. Lockdowns were reported all around the world [1, 2, 5, 11, 12, 14, 15], and traditional universities were forced to adapt themselves to new circumstances and to move all their pedagogical activities online and start working from home. The transition is evident from Eurostat data [3]. The proportion of regular internet users[1] between 20 and 24 (student population) in EU28, who took an online course, increased from 14% in 2019 to 27% in 2020, and 37% in 2021. Further, the proportion of users (20–24 years) who communicate with instructors or other students' using educational websites increased from 29% in 2019 to 41% in 2020.

[1] Used internet in the last 3 months.

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Online education in some environments is still a negative notion, primarily because of correspondence education a hundred or more years ago. Some classical universities still have not accepted the idea that learning outside of school walls could be performed successfully. The obligatory transition to online environments was a real shock for online-sceptical universities' management. Our university was one of them, so they determined that all contact hours must be substituted with one of the existing videoconference systems (Jitsi,[2] ZOOM[3] or MS Teams[4]). The university and faculty leadership were severely concerned about reducing and abandoning contact hours.

We had previous experiences with online teaching, so we organised several online workshops for colleagues to help them transition to online learning environments. We were almost grateful to the epidemic because it seemed to accelerate the digitalisation process at our and other traditional universities more than all the initiatives before.

Authors [1] analysed 47 scientific papers published in high impact journals about education during COVID-19. The study explored disadvantages and limitations, advantages and opportunities, and students' and teachers' feedback. Besides technology issues, they showed that students' engagement and participation were frequently low, mostly because of pre-recorded lectures. Low interaction, lack of personal contact, and digital fatigue caused by prolonged usage of computer screens decreased students' motivation and impacted their mental well-being. The research (ibid.) also exposed assessment issues that opened questions about evaluations modalities. Teachers must think about redesigning the whole evaluation process.

The same study showed that, on the other hand, online environments offer many opportunities for communication and discussion, sometimes even more appropriate for students who have difficulties or feel discomfort in face-to-face discussions (ibid.). Interestingly, only 6% of analysed papers reported improvement in students' performance.

The authors recommended rethinking pedagogical strategies and adapting them to online environments (ibid.). Implementing information and communication technology (ICT) in education, as with implementation of ICT in businesses [6], needs a concrete renovation of main processes; in education, this is the pedagogical process. Teaching strategies and course learning design must be changed and adapted to a new learning environment.

We were actively involved in remote teaching during the epidemic as a teacher who taught a course and as academic support at the university. We followed different discussions and research about students' success/dropout rates during the COVID-19 era. Comparing our experience and course outcomes to these discussions opens a research question: what caused positive impacts is presented below.

2 Business Informatics

Business Informatics is an obligatory course for undergraduate business students. It is taught in the academic and professional study programme of Management. Before 2013,

[2] https://jitsi.org/.

[3] https://zoom.us/.

[4] https://www.microsoft.com/en-us/microsoft-teams/group-chat-software.

the course was a part of the second-year courses, while from 2013 to 2019, the course was moved to the first year. In 2019, both study programmes were renovated, and the course of Business Informatics has been moved back into the 2nd study year. Skills topics resided in the 1st year (a new 3 ECTS course named "Study and ICT practicum" has been created) while the theoretical part of the course is now an obligatory course of the second year. Even though the students are surrounded by different ICT, Business Informatics has been one of the courses students struggled with the most. We tried to make this course more student-friendly and easier to understand and pass during these years, but we failed (Table 1). In the presentation, we include only courses taught by the same teacher so that the course learning design and teaching methods are the same and the teacher characteristics are excluded.

Table 1. Business Informatics statistics by years

Academic year	Professional study programme			Academic study programme		
	N students	Finished (N)	%	N students	Finished (N)	%
2018/2019	78	21	26.9	33	13	39.4
2017/2018	Taught by others			36	17	47.2
2016/2017	78	29	37.2	26	15	57.7
2015/2016	74	23	31.1	30	14	46.7

All courses at the faculty are taught quarterly – seven weeks of lectures, seminars, and tutorials; the eighth week is used for the examination. The final grade of the Business Informatics course is composed of graded weekly assignments (30%), an ICT skills test[5] (20%) and two mid-term exams (50%). Students presented in Table 1 finished the course with ongoing quarter work (column "Finished"). Students who failed at the end of the quarter could pass the exam during the regular examination periods (winter, summer, and autumn).

2.1 Course Design for 2020/2021

The remodelled course of Business Informatics was first taught in 2020/2021. As mentioned, the core of the theoretical part of the course stayed the same; thus, the topics on using ICT have been moved to another, 3 ECTS, course. An additional five hours of lectures and tutorials have been added to the new course. The first performance of the course faced another challenge: due to the epidemic of COVID-19, all pedagogical activities were moved online. The university, having no previous experience with teaching online, demanded that all contact hours needed to be undertaken synchronically via the ZOOM videoconference system. Teaching 70 h per course (35 h of lectures and 35 h of tutorials) online in 7 weeks is not something that we preferred to do, especially because we had previous experience with teaching courses online. We decided to use

[5] From 2019/2020 a part of the course Study and ICT practicum.

a combination of synchronous and asynchronous e-learning approaches (Fig. 1) and to combine different learning activities [8].

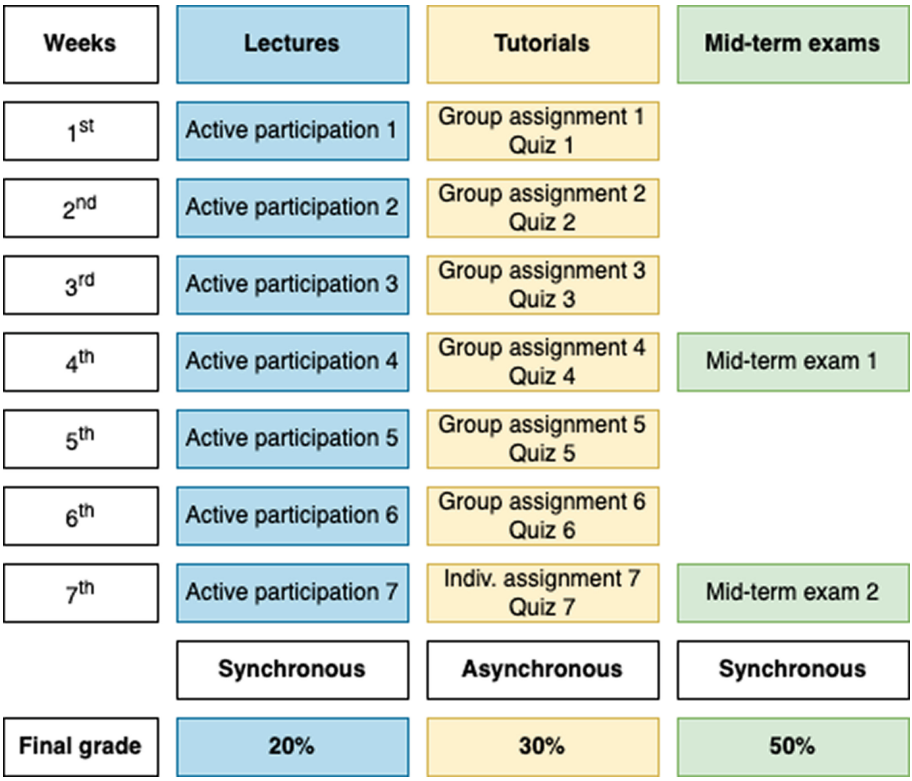

Fig. 1. Course learning design

Synchronous Implementation of Contact Hours (Lectures)

The week began with a lecture in ZOOM. Other personal and reported experiences of using video conferencing – students mostly passive participating or pursuing other activities during online lectures, the physical absence of the student, etc. – guided us to the introduction of so-called active participation activity. It was not enough that students only enrolled themselves in ZOOM meetings; they had to take notes from the lecture. The notes, with exceptions, had to be handwritten, as research prioritises such notes over computer-taken notes [7]. Students were organised into groups formed at the beginning of the course in Moodle during the lecture. The group list and students' distribution among groups were uploaded into ZOOM. Students were automatically assigned to their working groups each time a teacher started ZOOM breakout rooms. In separate groups, students performed different tasks related to the presented topic. In this way, we tried to link the presented theoretical concepts as much as possible to the practice and, above all, to enable students at a distance to communicate more with each other.

Communication can be achieved more smoothly in a smaller than in a larger group. The group work was supported by Google documents, where they answered different questions and resolved assigned problems. At the first meeting, a teacher moved from one breakout room to another, but later the teacher monitored their work only by following ongoing work in the group's Google documents. If the teacher noticed that the group was not active, she entered the group's breakout room and checked what was going on. Students were also able to call a teacher for help when they needed it. The breakout rooms are undoubtedly the most useful ZOOM feature when working synchronously at a distance. The feature impressed teachers and students. Lectures were recorded, and the recording link was shared with the students via Moodle. The recording was available until the end of the week so the students could view it again later. To accomplish the activity of "active participation", the students had to submit a photo of handwritten notes and a copy of the group Google document that they were working on. Students who, for various reasons, were unable to attend the morning lecture were able to view the recording later, write notes and submit the photo of the notes as other students did. For this, they received a portion of the points for active participation. In this way, we tried to eliminate technical difficulties (connection stability, access to the ICT etc.) as reported in many papers explored by Abu Talib [1].

Asynchronous Implementation of Contact Hours (Tutorials)
Tutorial hours were undertaken asynchronously. During the week, students had to accomplish two type of activities – a weekly group assignment (in the last week, the assignment was individual) and a knowledge quiz that was taken individually. Group assignments were done using Google Docs where each student's participation was easily identified; all students were obliged to participate. All weekly quizzes were time-limited, but students were free to start a quiz when it suited them the best – between Friday, 8:00 and Saturday, 15:00.

2.2 Student Successfulness

Both courses, in the professional and academic study programme, were taught online due to COVID-19. Students actively attended ZOOM lectures and ongoing weekly activities (group/individual assignments and weekly tests). The final grade of the course was composed of points received on ongoing activities (30%), active participation (20%) and two mid-term exams (50%) where they presented their knowledge of the theoretical part of the course (Fig. 1).

Table 2. Course completion statistics (2020/2021)

Study programme	Number of students	Number of passed	%
Academic	32	27	84.4%
Professional	33	27	81.8%

Comparing data in Table 1 with data in Table 2 shows that students' dropouts in 2020/2021 decrease and successfulness increases significantly. All students of the academic programme who had collected at least 50% of points on ongoing activities, the preconditions to accessing the second mid-term exam, succeeded. In the professional study programme, the portion was 90%. Some students dropped out at the beginning or during the course.

2.3 Course Evaluation

Each year, we ask students about the course's activities, learning design implemented, and learning outcomes achieved at the end of the course. The student's response is presented in Table 3.

Table 3. Student response

Study programme	Number of students	N of replies	Response
Academic	32	23	71.9%
Professional	33	26	78.8%

The Business Informatics course was performed online for the first time. As presented above, the videoconference system ZOOM was used to deliver lectures. Students were asked to express their opinion on the reasons for joining ZOOM meetings (Fig. 2). All opinions were expressed on the 4-degree scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). Averages 3 and up present agreements, while those below 3 present disagreements (Fig. 2).

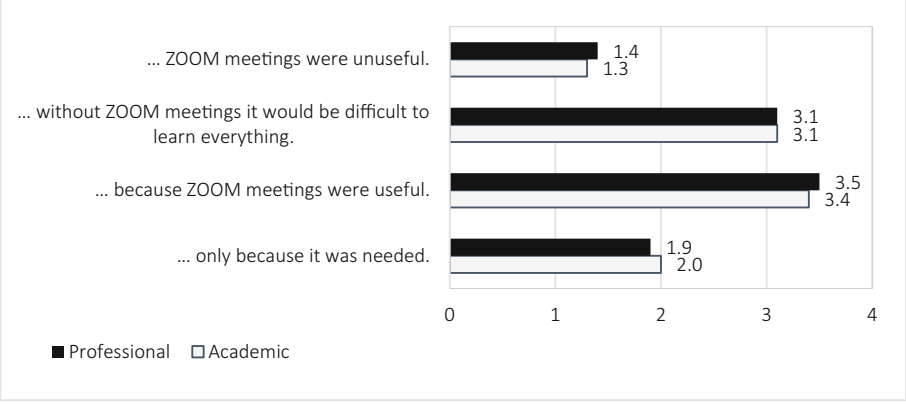

Fig. 2. Students' opinions about attending ZOOM meetings

The students' opinions do not differ significantly. Students attended ZOOM classes because the lectures were useful ($M_{Acad.} = 3.4$, $M_{Prof.} = 3.5$) and because without ZOOM meetings (lectures), the whole learning process would be more difficult ($M = 3.1$ for both groups of students). The lectures were recorded on the ZOOM cloud, and the recordings were accessible to students for the working week. Students of both programmes rated the usability of the recordings on the same 4-step scale with an average of 3.7, confirming our decision to record and share links to recordings for later view. The recordings allowed anyone who could not attend the ZOOM meeting to see the lecture later and obtain a large part of the points for active participation in the lecture (1.5 of 2.0 points).

A major part of the obligatory study material (a textbook) was updated and made available to students in PDF format, divided into chapters and accessible in Moodle. Students found the textbook chapters understandable, illustrative, and clear ($M > 3.0$ on the 4-degree scale) (Fig. 3).

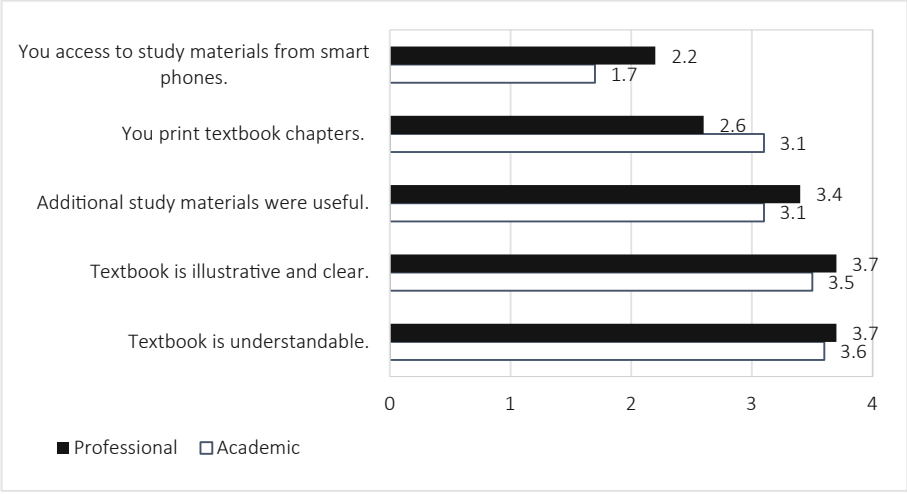

Fig. 3. Comparison of opinions on materials

Students who studied in academic study programmes printed more textbook chapters ($M = 3.1$) than students in professional study programmes ($M = 2.6$).

The difference between the two groups was found in how they used study materials. A third of students (34.6%) in professional study programmes read the textbook on smartphones. There were only two students in academic study programmes who used smartphones for reading the textbook (Fig. 3).

As mentioned, students had different ongoing weekly activities. Appropriateness was checked with the evaluation survey at the end of the course. Students expressed their opinion on the 4-step scale presented above (Fig. 4).

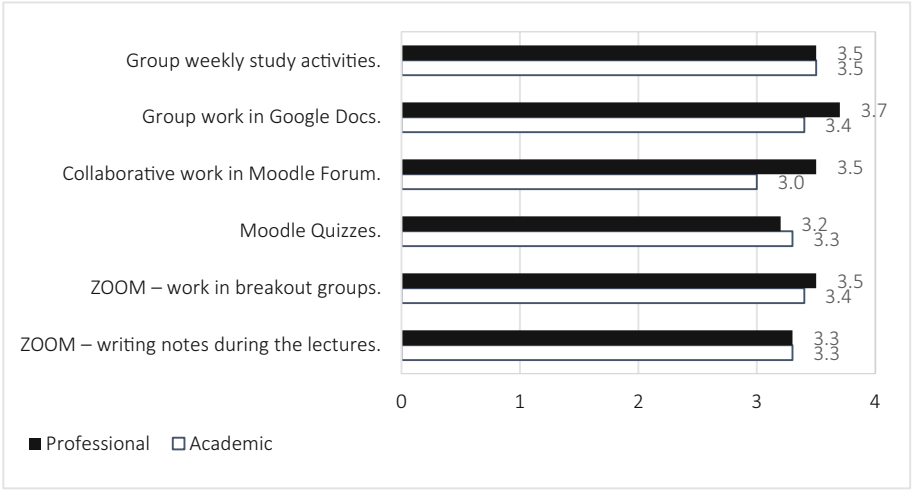

Fig. 4. Appropriateness of study activities

All weekly activities were very well accepted by all students ($M \geq 3.0$) (Fig. 4).

Although the study obligations were demanding ($M = 3.0$) and extensive ($M_{Acad.} = 3.2$ and $M_{Prof.} = 3.4$), the students performed them easily ($M_{Acad.} = 3.3$ and $M_{Prof.} = 3.4$). This was undoubtedly contributed to by comprehensible guidance ($M_{Acad.} = 3.4$ and $M_{Prof.} = 3.5$) and a clear presentation of study obligations ($M_{Acad.} = 3.7$ and $M_{Prof.} = 3.8$) (Fig. 5).

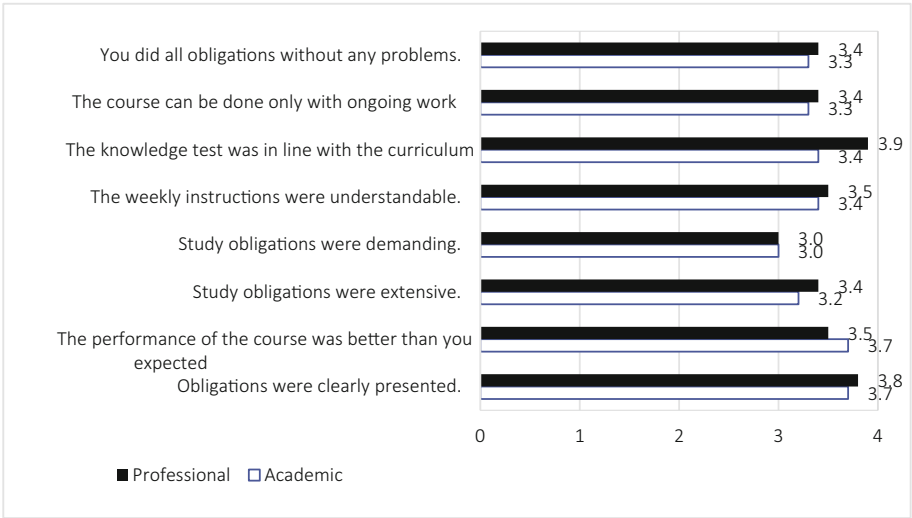

Fig. 5. The complexity of study obligations

Improving ICT use and developing awareness of the challenges associated with ICT use is one of the course objectives. We wondered if the objectives were met (Fig. 6).

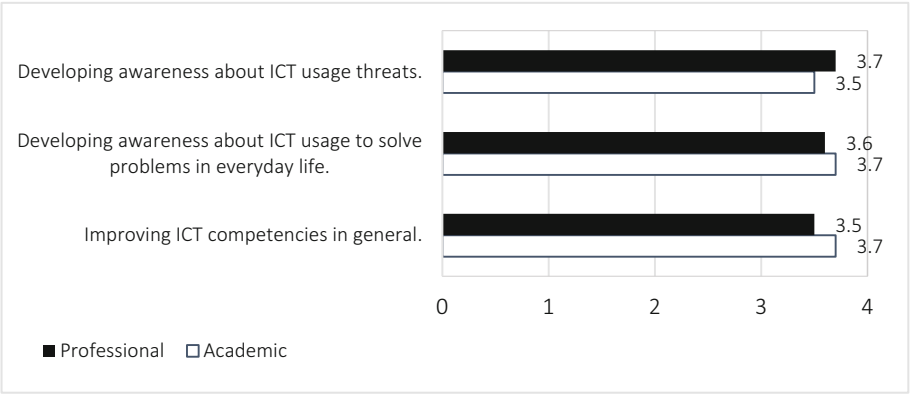

Fig. 6. Using ICT and awareness of the challenges of ICT use

Students in the academic study programme improved their ICT competencies in general ($M_{Acad} = 3.7$, $M_{ProfS} = 3.5$) and awareness of the possibilities of ICT use in daily life and work ($M_{Acad} = 3.7$, $M_{Prof} = 3.6$) more than their colleagues in the professional study programme. The increase in ICT skills is in line with what we already see in practice – students coming from grammar schools (except the economic grammar school) come with a gap in ICT competencies compared to peers from professional programmes, especially in economic directions. This gap is successfully filled during their study in business school.

During the course, the students' workload is monitored. Every week students reported the number of hours they spent studying Business Informatics (Fig. 7). There were no significant differences between both groups of students. An average student enrolled in an academic study programme invested 15.04 h in the course, and an average student in a professional study programme 14.95 h. The course lasts seven weeks, which means that the average student spent 105 h on the course. According to the ECTS system criteria, the average student should have to invest more (between 150 and 180 h for six ECTS courses). We must increase the burden on students, even if students consider that the study obligations were extensive (Fig. 5). The weekly load of students in the course should be at least 20 h per week, which is even more than students investing in performing all the obligations at the faculty.

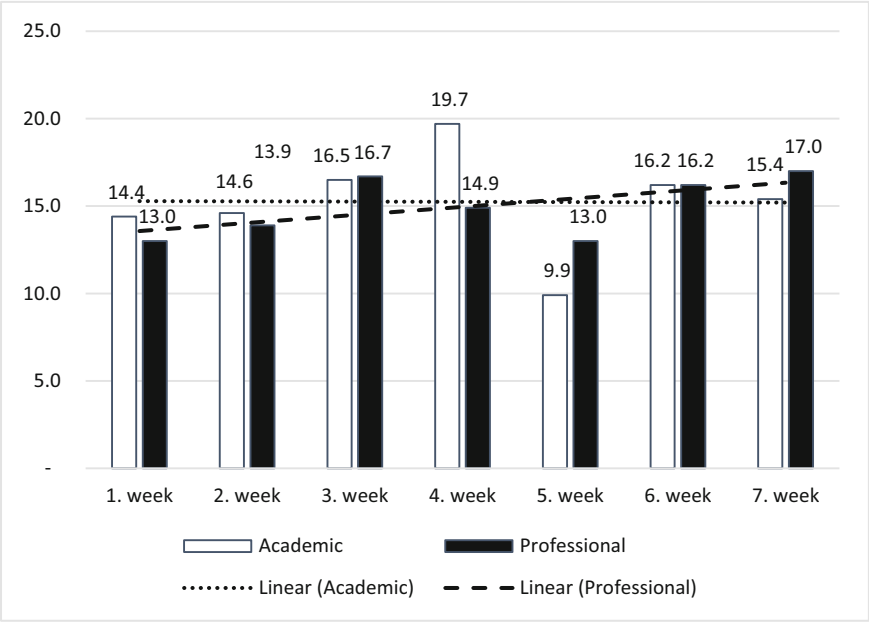

Fig. 7. Comparison of the weekly burden on students

3 Discussion

The COVID-19 pandemic forced all schools to move online. The university governance demanded substituting all contact hours planned in the curriculum and usually carried out in classical classrooms by one of the videoconferencing applications. Even if we had experience with online education, we had to follow the university guidelines and adapt the course design to new circumstances. All lecturer hours were undertaken synchronously using ZOOM. Four-hour lectures were divided by group activities taken in breakout rooms. Students had to take handwritten notes during the lectures, which helped them be active during the ZOOM lectures.

Every week students worked in groups asynchronously. They could meet each other via ZOOM if they wished; for these purposes, they had student ZOOM licences. And at the end of each week, students were invited to test their knowledge via Moodle Quiz. All of these contributed to increasing students' success at the end of the quarter (Table 2). It was the first time that most students successfully finished the course as early as the end of the quarter, even if the course had been performed online.

Moving the study process online due to the COVID-19 pandemic was criticised a lot because of missed physical student contact and opened questions about the appropriateness of online study. If we could organise the course asynchronously, we would omit long ZOOM lecture hours and substitute them with several asynchronous student activities. Due to the university e-learning requirements, we changed and adapted the course learning design, and surprisingly, we succeeded. However, the course in 2020/2021 had been moved back to the second study year; what is required is to see if the students'

success is related to the study year (students are a year older and already have some business knowledge) or is a result of course design.

We collected data about students enrolled in Business Informatics courses from 2005/2006 to 2019/2020. From 2005/2016 to 2012/2013, the course was taught in the second study year, from 2013/2014 to 2018/2019 in the first year and, as mentioned before, from 2019/2020 in the second year once more. The students enrolled in our faculty attended the course in 2020/2021. Students' data were collected from the student information system. The raw data offer us the possibility to compare students who passed the exams, to ascertain if the exam has been passed in the academic year, they had been enrolled in. We found that the academic year in which a course has been performed does not relate to the student's success. Based on data, it could be seen that students from 2013/2014 to 2018/2019, when the course was taught in the first year, were more successful than the previous generation. The success could be related to new study materials that were prepared. Still, data from 2020/2021 may indicate that the achievements are probably connected to the new learning design introduced during the epidemic. In 2021/2022, a similar learning design is being used, except that all lectures are performed in the classical classroom, not via ZOOM.

Students must be active during the lecture; they must take notes and collaborate in Google documents. At the time of finishing the article, students of the academic study programme have just finished the course. The success rate is lower than it was in the previous COVID-19 academic year. One-quarter of the students failed. It seems that the online course is more efficient than face-to-face learning. Students reported that attending lectures via ZOOM in-home in a safe and calm environment helps them be more focused, and recorded lectures enable them to watch the lesson again if they missed something or were unable to attend it live. We will check these assumptions with another group in the summer semester.

4 Future Research

The results are impressive and ought to be tested and compared to course performance in the future, in a post-Covid era, and to see if there are elements to contradict the well-known "The No Significant Differences" results of Russell's study.[6] These elements need to be identified and explained. It would also be interesting to use a similar approach to the courses from other non-IT study fields and compare the results.

References

1. Abu Talib, M., Bettayeb, A., Omer, R.: Analytical study on the impact of technology in higher education during the age of COVID-19: systematic literature review. Educ. Inf. Technol. **26**(6), 6719–6746 (2021). https://doi.org/10.1007/s10639-021-10507-1
2. Cullinan, J., Flannery, D., Harold, J., Lyons, S., Palcic, D.: The disconnected: COVID-19 and disparities in access to quality broadband for higher education students. Int. J. Educ. Technol. High. Educ. **18**(1), 1–21 (2021). https://doi.org/10.1186/s41239-021-00262-1

[6] https://detaresearch.org/research-support/no-significant-difference/.

3. Eurostat. ICT usage in households and by individuals: Individuals – internet activities. https://ec.europa.eu/eurostat/databrowser/view/ISOC_CI_AC_I__custom_1985604/default/table?lang=en. Accessed 27 Jan 2022
4. Florjančič, V.: Koronaizziv visokega šolstva. University of Primorska Press (2021). https://doi.org/10.26493/978-961-293-111-7
5. Ives, B.: University students experience the COVID-19 induced shift to remote instruction. Int. J. Educ. Technol. High. Educ. **18**(1), 1–16 (2021). https://doi.org/10.1186/s41239-021-00296-5
6. Laudon, K.C., Laudon, J.P.: Management Information Systems: Managing the Digital Firm, Global Edition, 15 edn. Pearson Education, Harlow (2018)
7. Mueller, P.A., Oppenheimer, D.M.: The pen is mightier than the keyboard: advantages of longhand over laptop note taking. Psychol. Sci. **25**(6), 1159–1168 (2014). https://doi.org/10.1177/0956797614524581
8. Palloff, R.M., Pratt, K.: The Virtual Student: A Profile and Guide to Working with Online Learners, 1st edn. Jossey-Bass, San Francisco (2003)
9. Perico, N., et al.: Bergamo and Covid-19: how the dark can turn to light. Front. Med. **8** (2021). https://www.frontiersin.org/article/10.3389/fmed.2021.609440
10. Platto, S., Wang, Y., Zhou, J., Carafoli, E.: History of the COVID-19 pandemic: origin, explosion, worldwide spreading. Biochem. Biophys. Res. Commun. **538**, 14–23 (2021). https://doi.org/10.1016/j.bbrc.2020.10.087
11. Ravi, R. C.: Lockdown of colleges and universities due to COVID-19: any impact on the educational system in India? J. Educ. Health Promot. **9**, 209 (2020). https://doi.org/10.4103/jehp.jehp_327_20
12. Sharma, A., Alvi, I.: Evaluating pre and post COVID 19 learning: an empirical study of learners' perception in higher education. Educ. Inf. Technol. **26**(6), 7015–7032 (2021). https://doi.org/10.1007/s10639-021-10521-3
13. Timeline of the COVID-19 Pandemic in January 2020. Wikipedia (2022). https://en.wikipedia.org/w/index.php?title=Timeline_of_the_COVID-19_pandemic_in_January_2020&oldid=1065622151
14. Watermeyer, R., Crick, T., Knight, C., Goodall, J.: COVID-19 and digital disruption in UK universities: afflictions and affordances of emergency online migration. High. Educ. **81**(3), 623–641 (2020). https://doi.org/10.1007/s10734-020-00561-y
15. Zawadka, J., Miękisz, A., Nowakowska, I., Plewko, J., Kochańska, M., Haman, E.: Remote learning among students with and without reading difficulties during the initial stages of the COVID-19 pandemic. Educ. Inf. Technol. **26**(6), 6973–6994 (2021). https://doi.org/10.1007/s10639-021-10559-3