DISTANCE EDUCATION AND LEARNING PROCESSES. A SURVEY AT UNIVERSITY OF CATANIA DURING THE COVID-19 PANDEMIC

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Abstract

The emergency situation caused by the COVID-19 pandemic required all Italian universities to implement alternative teaching strategies to traditional face-to-face lessons. At the University of Catania, this situation prompted the start of distance learning paths in a synchronous mode at the very beginning of the emergency. At the same time, the lecturers were encouraged to video-record the lessons in order to make them available to students also in asynchronous mode. On the basis of this emergency situation, an investigation was immediately launched to identify the consequences of the new teaching methods on student learning processes; the research began in the first phase of the lockdown in Italy (March 2020) and ended in January 2021.

The aim of this contribution is to present the results of the research conducted on a sample of 300 students following bachelor degree courses of the Department of Education at the University of Catania. The research aims to detect the students' points of view on the strengths and weaknesses of the synchronous and asynchronous ways of presenting lessons and their respective impact on learning processes. The results of the research could provide useful insights to rethink university teaching even when the emergency situation comes to an end.

Keywords: *Learning processes, distance learning, synchronous and asynchronous teaching, higher education, COVID-19.*

1. Introduction. The SARS-CoV2 pandemic and emergency remote teaching

As of March 2020 throughout Italy, and April 6, 2020 in 188 countries, a temporary shutdown of all services considered non-essential was imposed to curb the spread of the highly contagious COVID-19 pathogen (Sohrabi et al., 2020). This completely unprecedented situation required universities around the world to respond extremely quickly to the education and training needs of their students, often without being sufficiently prepared to plan, monitor and evaluate these new educational practices (Houlden, Veletsianos, 2020). There has been much discussion regarding Emergency Remote Teaching (ERT) in order to identify the special features of this new scenario. Emergency Remote Teaching is defined as a sudden temporary shift from the regular in-person educational process to an online mode of teaching and learning as a result of an immense catastrophe; in this sense, ERT is very different from regular online courses that are conceived and designed to be delivered virtually. What we know from academic research on the subject is that effective online learning is the result of careful and systematic educational design. Indeed, the design process and the careful planning of different phases and the components of the activities have a significant impact on the quality of the learning experience (Means, Bakia, Murphy, 2014). Clearly, this careful planning process—that the academic literature identifies as the main way to ensure the success of online teaching activities—is not possible in cases of Emergency Remote Teaching.

When ERT is initiated, what happens is that a course that was intended and designed didactically to be face-to-face or hybrid instruction is transformed into a distance education course; in some cases, the course is simply moved to a digital platform while maintaining the same instructional characteristics. ERT has particular features that distinguish it from what is normally referred to as online learning (Hodges, Moore, Lockee, Trust, Bond, 2020). These are the distinctive characteristics of ERT: it must be temporary; it is activated in response to a crisis or something beyond human control; it may involve working with few or poor resources; and the students involved may have no choice and may not be able to make the most of the content offered. The primary goal in these circumstances is not to recreate a sound educational ecosystem similar to face-to-face educational activities, but rather to provide temporary

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access to instruction and teaching aids in such a way that the course is quick to set up and reliably available during an emergency or crisis.

Many universities responded to the emergency situation in similar ways; with regard to the organizational aspects, basically, three forms of teaching activities have been put in place: synchronous, asynchronous and blended. The strengths of synchrony lie in the fact that the teaching activities can be kept almost unchanged from face-to-face activities with the possibility of the teacher interacting with students and therefore providing them with constant feedback. However, regarding the management of class time, due consideration should be given to the fatigue load caused by the continued use of electronic devices and screens. The flexibility of time is the main advantage of the asynchronous mode, since it allows students to access the lesson when it suits them best; in this way, problems concerning space and electronic devices that may arise from synchronous ERT are partially resolved. Obviously, this mode also has many critical elements since it does not allow for immediate feedback and collaborative activities that are carried out with the presence and assistance of the teacher. From what has been briefly described so far, it is clear that a mid-way solution in the form of the blended mode may be the best choice, since it provides synchronous lessons with the related interactions and feedback and, through the recording of lessons or the provision of supplementary materials and analytical, asynchronous exercises, it can meet the already mentioned needs for flexibility of distance activities (Hodges, Moore, Lockee, Trust, Bond, 2020).

Numerous difficulties were encountered during the transition to virtual education following the ERT model. These difficulties could be attributed to several factors: organizational, pedagogical and personal aspects. Regarding the organizational aspects, we can certainly mention the problems that academic institutions, teachers and students encountered in adapting to the characteristics of the new teaching and learning environment. The pedagogical aspects include the difficulty for teachers to redesign the modules to adapt them to the online platform, especially if this had to be done in a short period of time. As far as students are concerned, the problems involved the possibility of not being able to access the network and the fact that they found it difficult to concentrate during the online lesson due to the absence of eye contact, gestures and the typical atmosphere of a classroom lesson. Among the personal aspects, the need to carry out all these activities in a home setting certainly played a role: the family atmosphere is very often not conducive to the teaching and learning process. There can be many distractions for both teachers and students. The elements of the home environment that may have a dysfunctional impact on the process of online learning and teaching are the following: space management, sharing of devices, childcare responsibilities, and the differentiation between work-time and leisure time (Ferri, Grifoni, Guzzo, 2020).

However, in spite of these critical aspects, ERT seems to have just as many strengths for both teachers and students, such as: the student can view recorded sessions multiple times, and the frequent access to resources can provide extra opportunities for students to consolidate their knowledge; the new online learning environment can allow students to learn independently or customize learning pathways; after the initial emergency redesign of the curriculum, it can be reused for any sudden future changes; academic institutions have gained new skills and experience that may be useful in the future to adapt to similar situations; and the transition from conventional teaching to online teaching has, in part, bridged the digital divide in the conscious and functional use of advanced digital technologies for both teachers and students (Abdalellah, Basim, Abdul, Vigil, 2020).

2. Design and objectives

Following the spread of the SARS-CoV2 pandemic, the University of Catania promptly started Emergency Remote Teaching courses in synchronous mode on the Microsoft Teams platform. Although the University decided to adopt a single mode and a single platform, it nevertheless encouraged teachers to video-record the lessons in order to make them available to students also in asynchronous mode, thus creating a blended form. In the wake of this emergency situation, a survey was immediately launched to detect the consequences of the new teaching methods on the students' learning processes and to investigate the students' points of view on synchronous and asynchronous teaching activities.

The research started in the first phase of the lockdown in Italy (March 2020) and ended in January 2021; it involved students of the first year of the bachelor degree course in Educational Sciences at the Department of Education of the University of Catania.

The objective of the research was to detect the students' points of view regarding the strengths and weaknesses of the synchronous and asynchronous modes of the lessons and their respective impact on learning processes. The more general purpose of the survey was to give us useful insights to rethink university teaching at the end of the emergency situation by incorporating any strengths that emerged into traditional teaching and, if the emergency situation were to remain for a long time, to put in place actions to redefine the educational design of ERT to reduce the critical points detected.

3. Methods

3.1. Participants

The research set out to involve 300 students in the first year of the bachelor degree course in Scienze dell'Educazione e della Formazione (Pedagogy) at the University of Catania. A total of 194 students actually participated in the research, with an average age of 21 years (SD=4.9), predominantly female (94.3%).

3.2. Tools

By means of the online application Google Forms, students were given a questionnaire consisting of a) contextual questions, b) questions aimed at investigating the ways in which the students approached the lectures during the emergency period, as well as the positive aspects and difficulties encountered and, finally, c) the Questionnaire on Learning Processes (QPA-D) by Klement Poláček (2005). The latter consists of 90 questions on a 5-point likert scale, grouped into five scales:

- intrinsic motivation (MI): i.e., the belief that one can achieve success with a continued commitment to study;
- metacognition and self-regulated learning (MA): that is, the ability to adapt one's method of study to the discipline to be learned and to the activity proposed, to find ways to remember the content more easily and, at the same time, to be aware of the method used;
- learning strategies (SA): concerns the ability to understand if the strategies—the ways of setting up and conducting learning—are productive;
- consolidation of learning (CA): investigates how well students feel they can do the following: relate the content to be learned to what they already know; apply what they learn by studying to their everyday experience; integrate concepts and theories into a coherent structure; and consult various sources to better understand a topic; and
- superficial learning (AS): detects whether students are used to learning in a complete, schematic way, with great personal involvement and not by mere memorization aimed at social recognition, such as passing an exam; and whether they are able to grasp the differences between apparently similar ideas and find no difficulty in memorizing definitions.

4. Analysis of results

The minimum and maximum scores obtained by the students are shown for each scale. The mean scores obtained by the group are also shown (Table 1).

Table 1. Descriptive statistics for the QPA scales.

	N	Minimum	Maximum	Mean	Std. deviation
MI	194	31,00	90,00	69,07	11,47
MA	194	27,00	90,00	69,39	11,24
SA	194	30,00	90,00	68,22	12,65
CA	194	36,00	90,00	66,97	12,38
AS	194	19,00	78,00	47,18	11,65

As shown in Table 1, the students' mean scores were: metacognition and self-regulated learning (MA - 69.39), intrinsic motivation (MI - 69.07), learning strategies (SA - 68.22) and modes of consolidation of learning (CA - 66.97). However, albeit significantly lower, there is still a substantial percentage of students who show superficial learning (AS - 47.18).

Of the 194 students who responded to the questionnaire, 175 followed the lectures primarily in the synchronous mode, while the remaining 19 did so in the asynchronous mode. From the data shown in Table 2, higher scores on all scales of the QPA are evident among students who followed the lectures in the synchronous mode.

Table 2. Descriptive statistics related to the QPA scales for students who followed the lectures synchronously and asynchronously.

		N	Minimum	Maximum	Mean	Std. deviation
MI	asynchronous	19	46	84	64,84	11,16
	synchronous	175	31	90	69,53	11,44
MA	asynchronous	19	45	84	67,47	11,62
	synchronous	175	27	90	69,59	11,22
SA	asynchronous	19	47	85	65,95	12,72
	synchronous	175	30	90	68,46	12,66
CA	asynchronous	19	41	88	66,37	12,95
	synchronous	175	36	90	67,04	12,36
AS	asynchronous	19	23	64	46,16	11,23
	synchronous	175	19	78	47,29	11,72

However, the non-parametric Mann-Whitney test did not show statistically significant differences between the scores of the two groups. Specifically, for the scale relating to *intrinsic motivation* (MI), the scores were $U=1242.50$, $z=-1.808$, $p=0.071$; for the scale relating to *metacognition and self-regulated learning* (MA), the scores were $U=14872.50$, $z=-.753$, $p=0.451$; for the scale relating to *learning strategies* (SA), the scores were $U=1453.50$, $z=-.900$, $p=0.368$; for the scale relating to *consolidation of learning*, the scores were (CA), $U=1578.50$, $z=-.362$, $p=0.718$, and for the scale relating to *superficial learning* (AS), the scores were $U=1602.50$, $z=-.258$, $p=0.796$.

The lack of significant differences between the two groups in the QPA scores could perhaps be attributed to the fact that only 28 of the 175 students who followed the lectures in synchronous mode (16%) took advantage of this possibility to actively interact with the teacher during the lecture, asking for more clarification or expressing their own ideas. The students who did not take advantage of this possibility attribute this choice to the clarity of the content presented, the lack of time or need and, in some cases, also the awareness of having the video recordings available to return to certain topics.

Since the University of Catania encouraged all the teachers to video-record their lectures, our interest also concerned the use that the students made of these lessons. The data show that the students who attended the lectures in synchronous mode made a great deal of use of this possibility (70.3% - 123/175). Among the main reasons given by those who attended the lectures in synchronous mode and chose to review video recordings are the following: to return to specific aspects of the lecture; to enrich notes; to compensate for any distractions during the lectures or internet connection problems; or even to facilitate the learning process by listening more than once to the same topic.

The questionnaire also aimed to investigate the main difficulties encountered by students during distance learning. From the analysis of the answers provided by the students, the followed difficulties were reported: problems of a technical nature linked to the platform used (Microsoft Teams) and the connection to the internet network; difficulties in concentration, sometimes associated with situations in which other family members were also involved in smart-working or distance teaching; interaction with colleagues and teachers; and, in some cases, a decrease in psycho-physical well-being linked to spending most of the time in front of the PC. It should, however, be pointed out that about 31.4% of students did not experience any difficulties.

The students were also asked to identify any positive aspects related to the restriction of face-to-face activities due to the Covid 19 pandemic. Despite the fact that 15.4% of the students did not identify any positive aspects linked to the situation they unexpectedly found themselves in, many students recognized the importance of issues related to safety and the consequent reduction in the risk of contagion, especially for those who, before the emergency, used means of transport on a daily basis. The data also show how the reduction in travel time facilitated the possibility of devoting more time to study and, more generally, to a greater capacity for time management. Many also highlighted the convenience of being able to follow lectures from home and, if necessary, review video-recordings, the reduction in costs and, in some cases, the rediscovery of the value of small things, particularly in-person, human interaction which—obviously—is missing in the online learning experience.

Finally, the last question aimed to find out which elements of the distance learning experience the students wanted to maintain even after returning to the classroom. The data clearly show a desire to maintain the possibility of video-recording the lectures (46.9%), to offer a blended form of teaching, in which the students can choose whether to go to the class in person or continue to follow the lectures at a distance, on the basis of their needs. It also appears that the students appreciate the active teaching strategies implemented by some teachers and want to use the supplementary materials provided—often of a multimedia nature—also in face-to-face lectures.

5. Conclusions and measures that could be implemented

What our investigation has revealed may enable us to make many changes to the planning of educational activities for face-to-face teaching and distance learning in the future. Although the differences between students who have followed the lessons in synchronous and asynchronous mode are not statistically significant in intrinsic motivation, self-regulated learning and the other variables detected by the QPA scale, we may nevertheless hypothesize that the slightly higher scores for synchronous teaching activities are due to the interaction with the teachers. In addition, the fact that the student population requests that the possibility of using the recordings of the lectures remain at the end of the emergency situation—and the relative reasons given for this—leads us to believe that the video recording has become a real study tool for them and an important aspect of the communication channel between the teacher and the students.

To this regard, interesting issues have been identified that are open to further development. With the emergence of ERT, people were drawn to the use of platforms, tools, and modes of communication that are used by everyone. This has inevitably enhanced basic technical and computer skills related to educational aspects. Teachers and students have found themselves reinventing their classic modes of interaction by drawing on the strengths of distance learning platforms.

The success of the ERT experiences—from the point of view of both the students and the lecturers—has shown that university institutions should put in place some measures in the event that ERT situations continue in the near future, or in the case of another emergency situation, such as:

- training activities for lecturers on the functions and uses of the platforms to enable them to make the most of the potential of the platforms, also in terms of possible interactions, both synchronous and asynchronous;
- training activities on the pedagogical design of online courses so that ERT will not consist of the mere transposition of courses designed to be delivered in person to the online platform;
- training activities of a technical nature for students to help them avoid all the practical difficulties encountered during online lessons; and finally
- actions to strengthen the internet connection networks and increase the possibility of access to the platforms also from secure public locations.

In other words, the possible need for ERT means that it must become part of the skill set of all members of the academic institution. We have listed just a few of the measures needed in order to develop an infrastructure that can support the online learning-teaching process. Indeed, the success of face-to-face education is the result of the interplay of numerous factors that determine a true teaching and educational infrastructure: learning spaces, pathway sharing, teacher-student and peer exchanges, library resources, housing, career services and health services. The reason why face-to-face education is successful is not just because the lectures are done well. The lectures are an instructional aspect of a global ecosystem designed specifically to support students with formal, informal and social resources.

In the event of a return to face-to-face classes, still far off according to the latest estimates of contagion in Europe (Agosto, Campmas, Giudici, Renda, 2020), academic institutions will have to build on these experiences and implement the use of technological tools to encourage forms of interaction and feedback in addition to putting in place study resources capable of exploiting the visual learning channels that students say that they appreciate and use a great deal.

Therefore, the planning of an online education program that is effective even in an emergency situation requires the creation of an ecosystem of support for students and teachers alike, which requires time and further investigation of the topic. This gives rise to numerous challenges for educational research in the field, which will not only need to be able to implement the strengths that have emerged from ERT experiences in face-to-face teaching, but must also develop forms of instructional design that can quickly respond to additional emergency situations that may occur in the future.

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