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Remote online teaching beyond COVID-19 pandemic: a qualitative study across Physiotherapy programs in Italy

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Abstract

Background With the lockdown imposed by the Coronavirus Disease 2019 (COVID-19) pandemic, remote online teaching (ROT) became pivotal in the rapid reorganization imposed on the healthcare professions' educational programs. Physiotherapy programs were particularly affected, as they are characterized by hard and soft skills that are hardly learned with ROT. The purpose of the present study was to investigate the experiences and opinions on ROT by faculties involved in the education and training of Physiotherapy students during the pandemic, and on its possible application thereafter.

Methods Following accredited checklists for qualitative research, semi-structured interviews were conducted by members of the National Directorate of the Physiotherapy programs in Italy. Academic directors (AD) and clinical training coordinators (CTC) of Italian Physiotherapy programs were randomly selected and interviewed, to collect their experiences and opinions on the use of ROT before, during, and after the COVID-19 pandemic. Iterative rounds of readings and discussions were conducted to analyze the interviews.

Results A total of 22 participants were interviewed, reaching a satisfactory level of saturation. Before the COVID-19 pandemic, ROT was used sporadically in academic activities; during the pandemic, participants familiarized themselves rapidly with this new approach, which was generally abandoned thereafter. After initial difficulties, most participants recognized the importance of ROT in preserving education during the lockdown. A negative impact on Physiotherapy students was occasionally reported, especially during their final exam and thesis dissertation. Despite the limitations of ROT in Physiotherapy education, participants recognized its advantages in supporting administrative tasks, sharing lectures, and creating international programs. Its potential for pedagogical innovation and the opportunity for investments in Internet-based didactic approaches were also underlined.

Conclusions ROT was perceived as an important tool to preserve Physiotherapy programs during the COVID-19 pandemic. Although it was in general discontinued after the pandemic, many participants believed that it might contribute to establishing a "new normal" didactic paradigm in Physiotherapy education.

Keywords Distance education, Qualitative research, Undergraduate medical education, Physiotherapy

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Introduction

The strict, widespread, and prolonged social distancing imposed by the Coronavirus Disease 2019 (COVID-19) pandemic caused a profound disruption in higher education. More than others, healthcare professions programs were particularly affected because of their interdependence with overloaded healthcare services [1]. To overcome this problem, existing technologies for Internet communication were adapted to remote online teaching (ROT): entire clinical programs worldwide were rapidly re-structured to be delivered online, thus ensuring the continuity of health professions training over the pandemic.

Mixed feelings have been reported on ROT [2]: although it was recognized as an essential, and sometimes as the only means available for preserving education and clinical training in such unprecedented times, surveys often reported dissatisfaction with the online learning approach, compared with the traditional in-person delivery [3]. Several factors contributed to this dissatisfaction. First, the transition from in-person to remote classes would ideally require a gradual adaptation from all the constituencies involved, which lacked in the abrupt switch occurring because of the pandemic. Furthermore, barriers to digital education, which existed before COVID-19, became critically evident at that time [4]. Finally, and probably most importantly, computer communication was perceived as a poor surrogate of the close face-to-face interaction between educators and trainees and the live patient contact representing the hallmark of learning in most health professions.

Contrasting results have been reported on the effectiveness of ROT as a didactic aid in Physiotherapy, a discipline characterized by several hard skills (hands-on techniques) [5] and soft skills (empathy, communication, motivation) [6, 7] that could hardly be learned with ROT. Rossetini et al. assessed the performance of undergraduate students who had received online teaching during the pandemic: despite high student satisfaction, the performance during the oral exams was significantly worse compared to a historical control group, receiving traditional teaching [8]. Luedtke et al. reported that students trained with ROT on hands-on skills during the pandemic performed similarly to those in whom the same skills were taught with classroom teaching and practicing on peers; however, in a second part of the study, where in-person teaching and ROT were randomly assigned, performance was significantly better when learned from a lecturer and practiced on a peer than when learned from a video and practiced on a mock patient [9].

Observational studies [3, 4, 10] and systematic reviews [2, 11, 12] have been conducted to assess how ROT impacted students in medical and allied health sciences

programs during the pandemic. In contrast, educators were queried less frequently, although their perspective is important: in particular, their contribution is crucial to understanding how the experience with ROT has evolved, across different cohorts of students, from the pre-pandemic years through our post-pandemic days. Indeed, it should be recognized that the COVID-19 outbreak compelled higher education systems to familiarize themselves with new teaching and learning technologies, which were indeed already available, yet had previously been poorly applied in most countries, including Italy. This should stimulate research assessing to what extent and with which modalities ROT has entered and persists in higher education of health professions after the pandemic.

Italy was precociously and severely hit by COVID-19 and was the first Western country to enact nationwide lockdown measures [13, 14]. These restrictions impacted the higher education of healthcare professions extensively and for a prolonged time, although with some partial and temporary releases. Thus, ROT was applied in all Universities for approximately two years. We conducted the present study to explore the perceptions of faculties involved in the education and training of Physiotherapy students in Italy on the application of ROT during the COVID-19 pandemic and thereafter. In particular, our main research interest was to understand whether this experience prompted more extensive use of new teaching technologies after the pandemic and, if so, in which direction. Unlike previous studies [3, 15], where conventional epidemiological methods with closed-ended questionnaires were applied, data were collected via personal semi-structured interviews, because we deemed as important to capture the breadth and the width of opinions of the interviewees, an aim that can be better pursued with a qualitative research approach.

Methods

Study design and participants

The study was conducted according to qualitative phenomenological research design [16], following the Consolidated criteria for REporting Qualitative research (COREQ) and the Standards for Reporting Qualitative Research (SRQR) checklists for semi-structured interviews [17, 18]. It was designed and conducted by a group of investigators who serve in the National Directorate of all the Physiotherapy programs in Italy, an elective committee composed of five academic directors (AD) and five clinical training coordinators (CTC) of Physiotherapy programs, representing all the courses in the country. In Italy, the Physiotherapy programs are run by a full professor or an associate professor, who serves as the AD, with the support of the CTC. Both have longstanding didactic

experience in the field. However, the AD may not be a physiotherapist, whereas the CTC is always a physiotherapist, usually an Italian National Health Service employee.

As a first step of the study, all the AD and the CTC of Physiotherapy programs in Italy, with the only exclusion of those whose AD or CTC were members of the National Directorate, for a total of 31, were considered eligible for the study and were emailed an introductory message, which described the research and informed on the possible future call for participation. Then, two lists were created, one for the AD, and one for the CTC, from each of which potential participants were randomly selected and invited by email to participate. To enhance representativeness, it was decided that only one participant could be affiliated with the same academic center, so that, if two were selected, only the first one was to be maintained. Non-responders received a second invitation in 10–15 days; in case of unavailability or persistent non-response, the candidate participant was definitively excluded and replaced by the subsequent person in the random list. Invited individuals who gave their availability were contacted to schedule a videoconference via the Google Meet platform to perform the interview. A number of 10 AD and 10 CTC was initially targeted, with the potential to continue enrollment from the same two lists in case saturation was not reached.

Data collection

Following a phenomenological research design [16], we used semi-structured interviews to collect the depth and detail of the Physiotherapy educators' experiences and opinions. The phenomenological approach allows researchers to understand a phenomenon's universal nature by exploring the views of those who have experienced it. Semi-structured interviews elicit participants' insights and experiences and engage them in dialogues in which their perspectives are highly sought and viewed as important. This interviewing approach also provides opportunities to observe contextual clues that are usually missed when quantitative techniques are applied. In conducting and analyzing the interviews, the researchers are expected to bracket whatever beliefs and a priori assumptions they have about the experience or phenomenon, to avoid misrepresenting a subject's intended meaning, perception, or experience.

A guide of the interview was preliminary developed by the study investigators, who agreed on the inclusion of the following topics: 1) experiences with ROT before the pandemic; 2) modes of ROT utilization during the pandemic; 3) acceptance of ROT by faculties and students; 4) pros and cons of ROT; 5) current applications of ROT in the interviewee's Physiotherapy program after the

pandemic, potential future developments of ROT, and related investments. Participants were always allowed to discuss other topics beyond those proposed by the interviewer. The interview guide, which is available as a supplementary online file, was not pilot-tested.

All the interviews were conducted by study investigators, three men (MDB, RG, MP) and one woman (MD), all of whom had longstanding experience in teaching and coordinating Physiotherapy programs; one of them (MDB) had previous experience with qualitative research. Specifically, AD (MDB, RG) interviewed AD, and CTC (MD, MP) interviewed CTC. Permission to videotaping was always asked and obtained. Each videotaped interview was transcribed with the support of a dedicated commercial artificial intelligence device (Cabolo®, Italy. Website: <https://www.cabolo.com/>) and edited by the same investigator who had conducted it. Participants were not asked to provide feedback on the transcripts and interpretation.

Coding and analysis

Following standard qualitative research methodology [19], thematic analysis of transcripts was conducted with iterative rounds of individual readings and collegial discussions, without support from dedicated software. With the thematic analysis, a certain number of themes is extracted from the data, to inductively capture the personal experiences described by the participants [20].

Whereas the conduction of the interviews reflected the professional role (AD interviewing AD and CTC interviewing CTC), the subsequent phases of analysis and reporting did not. As is typical in qualitative research, the researchers could not remain blinded to the respondents' identity in the analysis phase, because they knew the participants' list and their academic affiliation, which was often recalled also during the interviews. However, to prevent biases, each interview was analyzed independently by all the investigators, who subsequently compared their opinions in a series of iterations.

In the initial fully immersive phase, each investigator read the transcripts of all the AC and CTC interviews while listening to the recordings, to get an overview of the material that had been collected. Then, each investigator read and coded the transcripts separately to identify central themes that accurately and completely describe the participants' lived experiences, while paying attention to recurring themes and possible ways to group them. In the following first round of discussion, the themes, their definitions, and coding rules were presented and compared across investigators: those identified by more than one investigator were retained in a codebook, whereas those proposed by a single investigator were analyzed collegially until consensus, and eventually discarded if they

were considered irrelevant or unamenable to redefinition and incorporation into other accepted themes.

Two further iterative rounds of reading and discussion were performed to select, interpret, sort, and assign transcript excerpts to each specific theme. A final round consented to verify the accuracy of the themes and to articulate them into a conceptual model. When the data appeared intrinsically and overtly contradictory, beyond differences in interpretation, the investigators did their best to convey the full range of opinions. Whenever possible, textual quotes, with the participant's number reported in brackets, will be used to illustrate the typical way in which respondents discussed these issues. To preserve confidentiality, participants' identities have been masked and their personal information has been reported in broad categories (Table 1).

Results

Participants

Out of 19 AD and 29 CTC contacted after random selection, 10 (53%) and 12 (41%), respectively, were available for the interview, whereas the others were non-responders and did not provide reasons for their unavailability. Out of the total of 22 participants, 10 (4 AD and 6 CTC)

were females; 11 represented Physiotherapy programs based in Northern Italy, 8 in Central Italy, and 3 in Southern Italy (Table 1). The participants had no previous strict professional or personal relationship with the researchers (e.g., they belonged to different academic centers and had no research collaborations), although they might have known them as elected AD and CDC representatives. No other persons were present during the interviews.

The duration of the interviews ranged from 9 to 31 min (mean $\pm$ SD: 18 $\pm$ 6 min). After the analysis of these first 22 interviews across four iterations of reading and discussion, a satisfactory level of saturation was reached: therefore, no further data collection was deemed necessary.

Participants described their experience with ROT in the three phases of before, during, and after the COVID-19 pandemic. Major themes of discussion and controversy were satisfaction/dissatisfaction with ROT during the pandemic and the potential of ROT for innovating didactics.

Experience with ROT before the pandemic

Before the pandemic, teleconferences were used sporadically in academic activities and were usually limited to administrative purposes, but rarely as a didactic aid

Table 1 Participants' characteristics

Participant #	Gender	Age class (years)	Years of academic experience	Years in charge as AD/CTC	Role	Geographic location
1	Male	40–44	10–14	< 5	AD	Northern Italy
2	Female	50–54	10–14	5–7	CTC	Northern Italy
3	Male	60–64	10–14	5–7	AD	Northern Italy
4	Female	60–64	15–19	8–10	CTC	Northern Italy
5	Male	60–64	20–24	5–7	AD	Central Italy
6	Female	55–59	< 10	< 5	CTC	Central Italy
7	Male	55–59	20–24	8–10	CTC	Northern Italy
8	Female	60–64	25 +	5–7	AD	Southern Italy
9	Male	65 +	25 +	5–7	AD	Central Italy
10	Male	40–44	15–19	5–7	CTC	Central Italy
11	Male	55–59	< 10	< 5	CTC	Central Italy
12	Male	50–54	15–19	5–7	AD	Southern Italy
13	Female	65 +	10–14	8–10	CTC	Northern Italy
14	Male	45–49	< 10	< 5	CTC	Northern Italy
15	Male	< 40	< 10	< 5	CTC	Northern Italy
16	Male	40–44	15–19	5–7	CTC	Northern Italy
17	Female	65 +	20–24	5–7	AD	Southern Italy
18	Female	55–59	< 10	5–7	CTC	Central Italy
19	Female	40–44	< 10	< 5	CTC	Northern Italy
20	Female	65 +	20–24	5–7	AD	Central Italy
21	Male	65 +	20–24	5–7	AD	Central Italy
22	Female	45–49	20–24	< 5	AD	Northern Italy

Abbreviations: AD academic director, CTC clinical training coordinator

in some form of e-learning. As occasionally mentioned by some participants, chat and social network connections among faculties, clinical tutors, and students, when established well before the year 2020, turned out to be very useful during the outbreak.

ROT during the pandemic

In most cases, the preferred mode for delivering ROT during the pandemic was with lessons in streaming, especially in the initial months; an asynchronous approach was applied by approximately half of the courses, usually in a later phase. The technologies applied differed largely site by site. ROT was used for all the courses and subjects, across both semesters of all three years of the program. The lockdown had a profoundly negative impact on clinical training, a crucial component for developing competencies in Physiotherapy students, which was indeed postponed and sometimes substantially shortened. Yet, few exceptions were reported: *"We tried to maintain the activity in person, implementing the same measures that were used for the staff who carried out the same activities... We managed to maintain at least 70% of the clinical training activities"* (#21). Participants frequently reported that ROT helped overcome the restrictions imposed on clinical training, allowing for the illustration of assessment procedures and treatment techniques, discussion of clinical cases, and development of clinical reasoning: *"An online internship program was started [...] for 120 h for each of the three years of the course... Essentially, we are talking about clinical cases presented to the student, then [...] the student was asked to write a report on the clinical case"* (#9).

Satisfaction/dissatisfaction with ROT

In the beginning, most faculties, especially those older and less confident with technology, had difficulties accepting ROT; some even felt intimidated. Few of them maintained their poor confidence until the very end: *"A professor, whose teaching contract had expired and was to be renewed, asked: Are you going to do in-person or online teaching? 'Cause I won't sign if you do it online!"* (#12). Faculties already stressed because of their COVID-19-related clinical activities reported other forms of unease: *"The pandemic has involved our clinicians a lot, also [with an] emotional commitment and this has also been a source of difficulty in being able to understand and accept distance learning"* (#12). However, the majority ultimately accepted ROT as an effective means to preserve education during the lockdown and sometimes appreciated its potential for pedagogical innovation. Occasionally, strategies were developed to provide faculties with both technical and psychological support: in one university, they were

involved in focus group discussions, and this proved effective in enhancing their coping abilities.

Acceptance of ROT from the students was reported to be favorable for general more than for vocational disciplines, which require closer interaction with tutors and patients. On the other hand, several participants perceived that ROT had a negative, sometimes traumatic emotional impact on their students because it was perceived as part of the disruptive experience of lockdown. Social distancing stands opposite to the relational approach that characterizes Physiotherapy professionals and students: *"The psychological problems have increased a lot and I must say that it hurts me too to see these things: as a physiotherapist, biopsychosocial model or not?!"* (#19). In particular, most students who graduated during the pandemic disliked taking the final exam and defending the thesis over the Internet, because this subtracted the social, enjoyable component from this important event in their life.

Some interviewees underlined that providing students with strong emotional support limited the negative psychological drawbacks: *"We've never left them alone"* (#15) and *"They felt more involved"* (#5). Sharing with the students the professional and human aspects of such an extraordinary experience was very important: *"All the physiotherapists, who are also our tutors and teachers [and had] to work in this emergency, at night, when they came back home, [...] tried to make their story, their experience available to the students"* (#15).

Almost all the interviewees recognized several advantages offered by ROT to the academic system as a whole and the educators, first of all, because it prevented the courses from shutting down completely at the time of lockdown. Even when no advantages were perceived, this negative feeling admittedly developed because of personal inadequacy: *"I am unprepared for distance learning, like many other teachers. Perhaps many of us have continued doing traditional teaching mediated by the screen"* (#18). Indeed, *"Many teachers were not, let's say, equipped or able to organize the lesson from in-person to online and therefore, in the end, many ... only sent [...] the slides. It wasn't a great success"* (#4). Somebody recognized: *"Distance learning is different from face-to-face teaching, so transferring the same lessons to distance didn't make any sense"* (#18).

The most frequently reported advantage of ROT for the students was to have them engaged and active despite the lockdown, but one interviewee also underlined a favorable effect on the development of their clinical reasoning skills: *"I must admit that the [students'] cohort achieving graduation, thanks to the increase in laboratories on clinical reasoning and clinical cases, did not appear so far*

behind in the final exam compared to other years, even better on certain things” (#14).

The most commonly reported limitation of ROT was that it was difficult to be sure that students were truly there “behind the screen” and remained fully engaged all the time during lessons, or were not cheating during exams. Many interviewees were strongly dissatisfied with ROT as a substitute for clinical training: more specifically and subtly, one of them complained about *“the impossibility of creating the conditions for the student to learn how to relate to others”* (#22), a relational competence that Physiotherapy students acquire during their clinical training. In contrast with the prevalent opinion, one interviewee stated: *“There has certainly been a reduction in quality also with regards to the results of the exams. Regardless of the scores, their achievements were certainly not the same as those in presence”* (#6). A further, systemic concern related to ROT was that *“Dissemination of content online involves privacy and copyright issues”* (#15).

ROT after the pandemic: present applications and future developments

According to most participants’ reports, ROT was in general abandoned after the conclusion of the pandemic: limited exceptions were permitted, as in the case of a shortage of classrooms. In most cities, the University’s leadership required in-person lessons to be fully restored, leaving almost no room for ROT. This was probably because ROT *“was something brought on by the pandemic and freeing yourself from the pandemic [meant] freeing yourself from all the things connected to the pandemic ... It’s a psychological reaction that, like many psychological reactions, is absolutely non-rational”* (#21). However, many reported that ROT had at least stimulated some discussion on innovative, Internet-based didactic approaches and, with very limited, though firm, oppositions, was considered with favor: *“In the wake of ROT, there has been much more open-mindedness [...] also on alternative possibilities to the classic face-to-face teaching. Many barriers that were perhaps preconceptions have been knocked down”* (#19).

It was often suggested that what was learned then could be applied also now: becoming familiar with ROT showed how online communication can ease many administrative tasks via virtual meetings; share lectures across different locations of the same course or different courses (e.g., Physiotherapy and Nursing); reduce the need for transfers and, therefore, expenses and pollution associated with transportations; facilitate the involvement of experts from other universities, including from abroad. From a wider perspective, it was also suggested that ROT could support Italian universities that aim to

create international programs: *“If programs are developed in English, which will necessarily have an international audience, [...] it cannot be thought that, to follow these courses, one must reside for a few years in [city] or wherever it is”* (#21). Some participants emphasized the potential for innovative education associated with ROT, such as “teaching on the job” from specialty clinics or operating rooms, or while dealing with persons with severe disabilities that might be difficult to reach out otherwise.

Rarely, ROT was reported to be currently integrated into the regular didactic planning: *“[In] all the programs linked to the School of Medicine, [...] although the University reiterated that the lessons had to be held in person, [...] especially for courses with duration of at least 40 h, it has been guaranteed that at least 10% of these lessons will be delivered electronically”* (#7). Integration involved some rethinking: *“For us, the concept of ROT is fortunately outdated, that is, we no longer have distance learning, but the teaching we are using now is called assisted telematic teaching”* (#7). Another interview offered: *“From the qualitative point of view of learning, [ROT] has better characteristics than the presence [...] The cognitive structure of students has also changed: they learn more in different ways. Lately, I also accompany the lesson through videos on YouTube and when you launch the video everyone pays attention, [...] whereas when you speak the attention drops”* (#22).

Interviewees also had different perspectives on the future of ROT. At one extreme, a couple of participants strongly opposed dedicating resources to ROT: *“Investing on ROT? We already have many telematic universities blossoming, why are we going to chase them?”* (#10), and *“Students are already very distracted by the socials they follow and I think that if we removed even that little bit of presence in the classroom, they would be further penalized. I’m against it”* (#4). Conversely, most other interviewees favored maintaining and supporting ROT, although they diverged on the most appropriate direction for resource investment. According to approximately half of the participants, dedicated infrastructure and technology would require the largest share of support. In contrast, others reported that *“It was surprising for us to see that the instrumentation and technological equipment were already ready before the pandemic and no one was using them. The pandemic served as a stimulus to use something that the University had already purchased, it was just ready to use”* (#16). Almost all the interviewees suggested training and education of faculties toward ROT as the highest priorities for resource investment: *“Distance learning would require continuous training and personalized training, which presupposes a more creative approach on the part of the teacher. Let’s say that the learning process in ROT is more complex”* (#20).

Radiologic Anatomy and Research Methodology were brought as examples of disciplines that might take the greatest advantage from the application of ROT.

Conceptual model

To summarize and help interpret the findings from the interviews, the conceptual model reported in Fig. 1 was developed. Satisfaction with ROT was considered to be supported by objective, largely agreeable factual elements: for example, it is indisputable that ROT prevented programs from shutting down, limited the impact of restrictions on clinical training, and facilitated logistics. Some respondents' opinions, such as that ROT stimulated clinical reasoning and was better attuned to students' cognitive structure, can be considered strictly personal perceptions or beliefs. Finally, prior familiarity with remote communication technologies or the technical and psychological support provided to faculties and students, mentioned by some participants, somehow stands midway between factual elements and pure opinions and might be interpreted as modulating factors. Similarly, dissatisfaction with ROT might be attributed to objective reasons for concern, such as the limited chances for social interactions and the difficulty assessing

students' engagement behind the camera, to beliefs and (mis)perceptions (e.g., that ROT coincided with lockdown), and to external barriers, such as poor confidence with technology, that might have facilitated the emergence of a negative judgment on ROT.

At a distance, a considered judgment on ROT is required to envision its possible future developments: to achieve this goal, satisfaction(s) and dissatisfaction(s) emerging during the pandemic need to be adequately balanced. At the same time, further factors should be considered. Some of these, such as that ROT might ease administrative tasks and lecture sharing, would support the utilization of ROT. On the other hand, the impressive current diffusion of purely telematic academic programs and the risk that students would be more distracted by ROT may represent warnings towards its extensive application.

Discussion

According to the participants in this qualitative research, faculties across the Physiotherapy programs in Italy were almost completely naive toward ROT before the COVID-19 pandemic: however, they converted rapidly to this new approach and, after initial

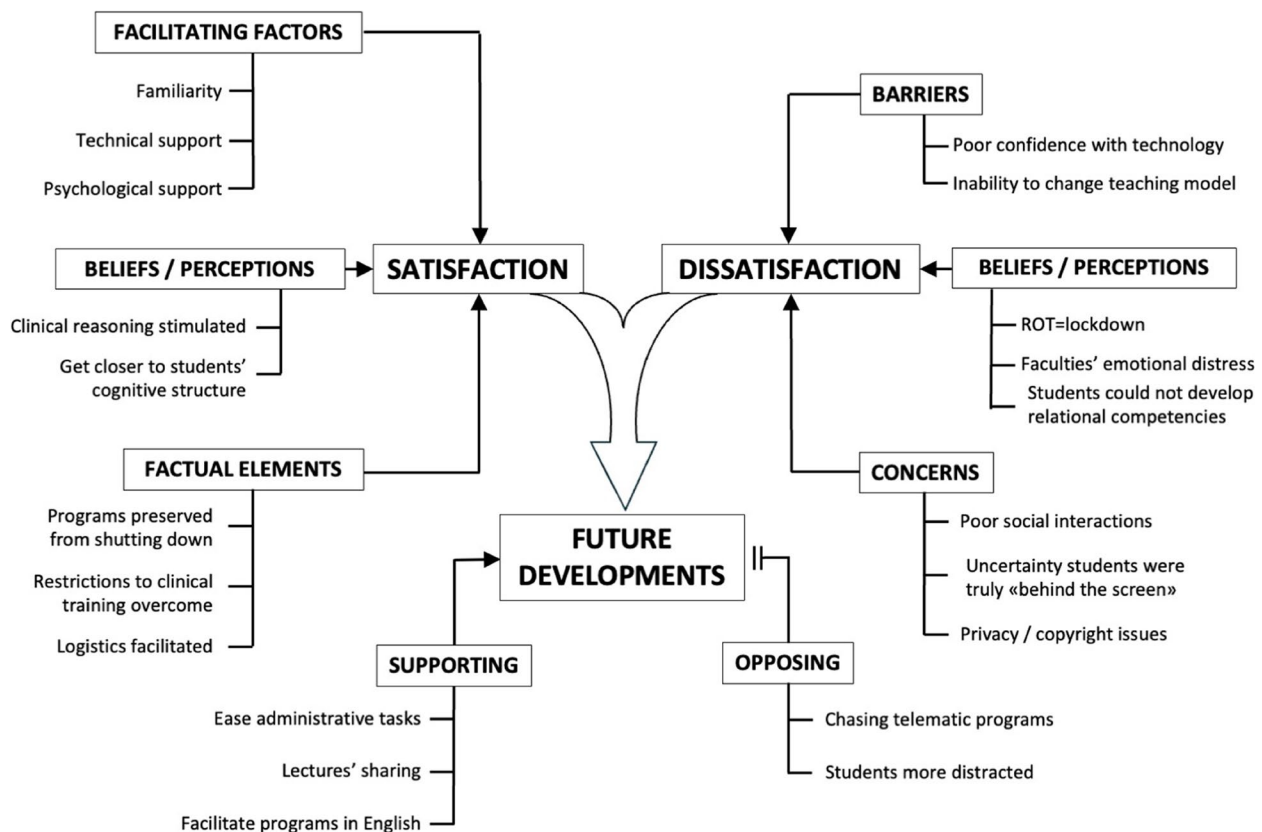


Fig. 1 Conceptual model of the themes emerging from the interviews

difficulties, usually recognized its importance and value in overcoming the problems brought by the outbreak to the higher education system. There was also a substantial agreement that this unexpected, forced application of ROT consented many educators to familiarize with innovative didactic, but only a few interviewees reported that some form of Internet-based teaching was maintained in their Institutions after the conclusion of the pandemic.

Several previous surveys [3, 8, 9] have been conducted to evaluate how ROT was accepted by educators and students in medical schools and how it affected students' performance and development of competencies, with contrasting findings. As far as Physiotherapy students, some authors reported poor satisfaction and perception of an inadequate level of competence [3], particularly for practical, hands-on skills [3, 9], whereas in other investigations educational achievements with ROT were comparable to those obtained with the traditional, in-person approach [8]. However, quantitative research may not reflect all the nuances involved nor allow a complete understanding of the contrasting feelings and perspectives. Qualitative studies may offer a more profound exploration of this topic. In a focus group study conducted by Ng et al. [21], Physiotherapy students presented anxiety, stress, and reduced motivation to study during the pandemic. They expressed their preference for face-to-face learning, as it provided social support, facilitated feedback from peers and tutors, and was invaluable for practical classes. Nevertheless, they did not oppose ROT completely: online lectures and supplementary videos were considered useful adjuncts when modulated by healthy learning habits, such as scheduled times for studying, exercise, and other activities that regulate stress.

Besides students' opinions, it is important to capture the perspective of educators, as we did in our study. O'Brien et al. [22] asked 20 staff from several allied health sciences programs, including Physiotherapy, to provide written narrative responses to 10 open-ended questions related to their experience as educators during the pandemic. All the respondents reported increased workload associated with converting teaching to online delivery, adapting to working from home, and dealing with high levels of students' distress. Major efforts were required for curriculum rewrites, development of online content, learning how to utilize online technologies, and maintaining students' engagement in the virtual space. Moreover, the educators admitted that overcoming their own beliefs about the effectiveness of distance teaching for health professional training was challenging. At the same time, unexpected positives were acknowledged. The COVID-19 disruption resulted in a rapid, largely self-directed upskilling of educators, mainly in the use of

technological devices but also in the pedagogical field, for example in the use of simulated patient experiences [22].

Other qualitative research studies deserve mention. In a focus group study from Australia, which enrolled 21 physiotherapists (17 educators and four leaders) from different Physiotherapy programs in the Sydney area, two main pedagogical issues emerged after the delivery of ROT during the pandemic: 1) the difficult balance between maintaining standards of practice and academic progression and 2) managing the delivery of ROT under resource constraints [23]. On the other hand, lessons were reported to be learned from the ROT experience, such as the need to question existing practices and to open to new ways to do things, in the expectation that change could bring improvement [23]. A subsequent report from the same study underlined that the ROT at the time of the outbreak was associated with high levels of psychological stress among educators [24].

From the foregoing, it is evident that several similarities exist between our findings and those from previous studies. Thus, we can argue that the experience with ROT, although challenging in many aspects as part of an unprecedented disruption of higher education for healthcare professionals, has somehow broken the glass ceiling of consolidated pedagogical habits. These effects, representing sustained legacies of the period, should be valued to prompt novel didactic approaches and build a "new normal" beyond the COVID-19 pandemic, where technology is used intentionally and strategically and not simply as a surrogate of traditional in-person classes. Combining online and face-to-face learning in blended learning models may enhance flexibility and accessibility. The availability of pre-recorded lectures and demonstrations helps students learn at their own pace, whereas the addition of subsequent question-and-answer live sessions allows for clarification of doubts. Interactive online workshops enhance small group discussions or practice scenarios, promoting students' engagement and peer-to-peer learning. Finally, ROT offers students the unique opportunity to enter operating rooms or other restricted teaching-on-the-job scenarios virtually. Therefore, ROT should be considered a valuable addition to the toolbox that faculties in Physiotherapy programs can draw on in their current practice.

Only a few of our respondents reported that efforts to implement ROT had already been successfully undertaken in their Institutions, yet many were eager to move forward along this path. Following the prevalent opinion reported by our participants, we believe that resources must be dedicated to this effort, in particular to train educators and help them develop the most appropriate and balanced integration between face-to-face and online teaching, choosing among the different models that have

been proposed [25]. A greater familiarity with remote teaching and learning should also be recommended in light of the recent developments in telehealth, which is increasingly used in different fields [26, 27]: we would suggest that students experiencing Internet-based learning will become professionals with an increased familiarity with telehealth.

This study has several strengths. We chose a qualitative research approach because it may offer an in-depth representation of the participants' thoughts, opinions, and perceptions, which can hardly be collected with conventional epidemiological methods. Our interviewees were leaders of Physiotherapy programs in Italy, therefore representing a diversity of situations across the country. To obtain adequate stability and credibility of our findings, we applied a rigorous methodology to data analysis, based on iterative rounds of individual readings and collegial discussions among expert investigators. Study limitations should also be acknowledged. Physiotherapy programs in Southern Italy were underrepresented in our sample, because it was selected after simple randomization, with no previous stratification by geographic area: thus, our findings might not be fully generalizable to the entire country, as well as to other countries. Since only AD and CTC were enrolled and interviewed, we relied on their words to infer the opinions of other educators and students, instead of interviewing them directly. To promote an open, peer-to-peer discussion, the interviews were conducted within the same professional roles (AD with AD, CDC with CDC): although this choice might be considered as a potential source of bias, we felt this unlikely because the interviewers respected the principle of eclipsing and the transcripts were analyzed by all the investigators, regardless of their academic role or position. Techniques to enhance the trustworthiness of the study findings [28], such as participants' checking, audit trail, and triangulation, were not applied.

The implications of this study for education and research should be briefly discussed. While incorporating ROT into Physiotherapy programs poses challenges, it also offers numerous opportunities to enhance learning experiences and prepare students for contemporary practice in a digital landscape. Moreover, it may contribute to a new normal didactic paradigm in Physiotherapy education, closer to current students' attitudes and learning approaches. However, this could be achieved only with adequate resource investment to enhance teachers' pedagogical competencies. This effort should be accompanied, or even guided, by research studies evaluating its effects.

In conclusion, in agreement with previous investigations from other countries, faculties from several Universities across Italy recognized that ROT, despite its

drawbacks, was an important tool to preserve Physiotherapy programs during the COVID-19 pandemic. After that time, ROT was in general discontinued: yet, its potential for didactic innovation should be valued and assessed in future pedagogical research studies.

Abbreviations

AD	Academic directors
COREQ	Consolidated criteria for reporting qualitative research
COVID-19	Coronavirus disease 2019
CTC	Clinical training coordinators
ROT	Remote online teaching
SQRQ	Standards for reporting qualitative research

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12909-025-07386-2>.

Supplementary Material 1.

Supplementary Material 2.

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Authors' contributions

MDb: contributed to the study concept, study design, data analysis, data interpretation and writing the manuscript. MD: contributed to the study concept, study design, data analysis and data interpretation. MP: contributed to data analysis, data interpretation and writing the manuscript. RG: contributed to the study concept, study design, data analysis, data interpretation and writing the manuscript.

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Data availability

The data used for this study, consisting in interviews' audio files and transcripts, are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study adheres to the Declaration of Helsinki. The study did not require Ethics Committee review, according to the "Ethics and data protection" regulations of the European advisory body and European Commission [29, 30]. Informed consent for registration and its use was obtained from each participant at the start of registration.

Consent for publication

N.A.

Competing interests

The authors declare no competing interests.

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