Hybrid Education in Higher Education on the Example of Academic Teachers' Experiences in Post-pandemic Reality

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Abstract—The article concerns the experiences of academic teachers related to hybrid education at the end of the SARS-CoV-2 coronavirus pandemic. The aim of the study was to understand the lecturers' perspective on hybrid education implemented in the first semester of the 2021/2022 academic year at The Maria Grzegorzewska University and an attempt to compare it with traditional education and distance education. The subject of the research was, among others, readiness to implement hybrid teaching, university support for lecturers in the field of hybrid teaching and the diversity of experiences of academic teachers. The research used the method of diagnostic survey. The obtained results indicate that the lecturers declare their readiness to conduct hybrid teaching, especially in the case of their own or students' illness, or random factors that make it impossible to conduct full-time classes or top-down legal regulations. They appreciate the organizational support of their immediate supervisor and the opportunity to make up for classes that have not taken place in a hybrid form. The lecturers highly assess the level of their own involvement in the preparation and conduct of classes, as well as the quality of their didactic work. They see the possibility of using a hybrid approach not only in teaching but also in their self-improvement, work organization and maintaining health. At the same time, they indicate the shortcomings and difficulties related to didactics, social, technical, and organizational aspects, as well as systemic deficiencies. Based on the results, recommendations related to the use of hybrid education in post-pandemic academic education were developed.

Keywords—hybrid education; higher education; academic teachers; blended learning; COVID-19; SARS-CoV-2

I. Introduction

FOUR semesters of remote crisis education in schools and higher education made it possible to gather experiences that translated into building new educational solutions. The first semester was the time of adaptation to the new situation on the part of universities [1], academic teachers [2] and students [3]. At the end of the second semester of the crisis remote education, research showed an improvement not only in the quality of education but also an increase in the IT competences of lecturers, which was also noticed by students [4]. However, the problem was, among other things, the lack of systemic financial support for the creation or modernization of a workplace for remote work at home [5]. Moreover, lecturers indicated a significant decrease in the level of students' involvement, their activity and regularity of work, as well as the quality of performing tasks [6]. They also lacked the possibility of personal contact with students. They eagerly used the training and technical support offered by the university's IT department. They appreciated the saving of time (mainly on commuting) and the lack of the need to physically appear at work [7]. The difficulty in implementing remote education was assessment and examination understood as a method, process, and its control. Technological possibilities of conducting examinations (automation in checking, grading, and archiving), timesaving (immediate obtaining of results, flexibility of deadlines), and organizational improvements are the main advantages indicated by lecturers but also appreciated by students [8]. The drawbacks were the inability to control the independence and honesty of students [9]. Subsequent studies concerning opinions on stationary and remote testing, carried out during a pandemic, were perceived from the perspective of examiners [10]. They looked for differences and similarities in the method of examining stationary and remote modes. According to the lecturers, in the remote mode, the independence of students is smaller, and the intensity of using unauthorized assistance by them is greater. Remote exams generate more problems - technical and related to the dishonesty of students. Lecturers hardly recognize and consider the special educational needs of students during remote examinations [11]. These experiences of academic teachers translated into their readiness to look for new forms of work with students, adequate to the changing pandemic situation. Therefore, when there was a change in the intensity of infections and the related need to flexibly respond to the needs of the moment, remote and stationary classes were introduced in The Maria Grzegorzewska University interchangeably or were combined at the same time. These new developments prompted researchers to look at the lecturers' experiences with hybrid education.

II. Characteristics of Hybrid Education

Hybrid education is a type of learning and teaching that is blended in nature: it includes live classes and online sessions, both face-to-face and distance learning. Online interactions can be synchronous or asynchronous [12]. The essence is the inclusion in education of technological solutions that allow, at least in part, distance teaching or learning, combine different teaching models and allow for effective communication [13].

There are four models of hybrid education [14]:

Rotation Model, in which the essence is to change the places of learners, according to the plan prepared by the teacher. It is a

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choice between traditional and online forms. Students can work in small groups, but lectures for everyone or individual work are also possible. Rotation can be for the whole group or only for individuals. The content and instructions are available online, but some of the classes, especially the practical ones, are held in the classroom. At the same time, Individual Rotation is characterized by such changes in work modes, which are established in the individual schedules of students.

The Flex Model allows for such movement between activities that is consistent with the needs of the learner. The teacher should provide on-site support, adequate to the project being carried out.

The Self-Blend Model treats the remote form as a complement to traditional teaching. Learners can follow, in addition to traditional classes, one or more courses via the Internet, also asynchronously, independently deciding which ones they need. They are then under the supervision of an online teacher.

The Enriched Virtual Model is a form in which students learn mainly online and are not required to be present in a day-to-day environment. For example, the condition for maintaining the dominance of the remote study mode is to maintain high grades.

Another division relates to the organization of work in the classroom. And here we can distinguish a synchronous and separated model, in which students participate in the same classes, at the same time, both on-site and remotely. The Rotational Model divides students into two groups, one of which is home-schooled, and the other is home-schooled according to a fixed schedule. The Partial Opening Model divides students, for example, in such a way that traditional education is used by some people selected according to a specific criterion, e.g., special educational needs, lack of suitable conditions at home, etc. [15].

In hybrid solutions, personal meetings and face-to-face interactions increase motivation, give a sense of belonging and community, and enable teachers to adequately respond to non-verbal messages during classes [16]. On the other hand, the remote form gives the opportunity to work at an individual pace and flexibility, which allows modifying both the work mode and the schedule of classes. It is based on the independence and maturity of students, and at the same time, it is also an economic form. Time and methodological facilities are used more efficiently. The behavior and care for social contacts and a better influence on learners are also noticed.

In order to successfully implement hybrid education, it is necessary for a university to have a technological background as well as IT and didactic competences of lecturers. Lecturers must have a well-thought-out concept of the lesson and the relationship between the teaching and learning process of the students [17]. In this education, the teacher creates a student-centered environment by encouraging and increasing the motivation for independence and cooperation with the use of new technologies [18]. It is also advisable to follow the five steps of the hybrid course, which include: design, development, implementation, evaluation, and verification [19].

III. METHOD

The research conducted concerned the experiences of academic teachers employed at The Maria Grzegorzewska University related to hybrid education at the end of the SARS-CoV-2 coronavirus pandemic. The aim of the study was to learn about the lecturers' perspective on hybrid education implemented in the first semester of the 2021/2022 academic year at The Maria Grzegorzewska University and to try to compare it with traditional education and distance education. The subject of the research was, among others, readiness to implement hybrid teaching, university support for lecturers in the field of hybrid teaching and the diversity of experiences of academic teachers. An attempt was made to compare traditional, distance and hybrid education, taking into account the opinions of academic lecturers. The practical goal was to develop recommendations for the implementation of hybrid education at the university.

The research formulated research problems with the following content: What are the lecturers' opinions about hybrid education? What are the similarities and differences between traditional, distance and hybrid education?

The research used the method of diagnostic survey. A questionnaire was prepared. Responses from respondents were collected using the Google Forms electronic form - the questionnaire was sent via the university mail to all teachers employed at The Maria Grzegorzewska University. The statistical analysis of the research results was carried out in the IBM SPSS Statistics 27 program. The analysis of the respondents' statements and their categorization was carried out by two competent judges.

IV. RESULTS

In the survey addressed to academic teachers, 62 people took part, which is 17% of the employed. The youngest respondent was 35 years old, and the oldest 81 (M = 43.6; Me = 42.5; Mo = 42). The majority of respondents were women (52 people; 84%), and the minority were men (10 people; 16%). Most of the respondents had a PhD degree (41 people; 66%), 15 people (24%) had a master's degree, 4 people (6%) had a postdoctoral degree, and 2 people (3%) had the title of professor.

The lecturers were asked to declare their readiness to implement hybrid teaching depending on the situation and needs. Lecturers assessed 6 cases, such as lecturer's illness or isolation, student illness or isolation, random factors (e.g., bomb alarm), top-down legal regulations, student request, and own convenience (e.g., conducting classes remotely from the conference trip) on a scale from "Very low "(1) to" Very high "(5). The results are presented in Table I.

TABLE I
DESCRIPTIVE STATISTICS
OF READINESS TO IMPLEMENT HYBRID TEACHING

	M	Min	Max	Me	Mo	Ske	K
Lecturer's illness or isolation	4.26	3	5	4	4	0.13	-1.08
Illness or isolation of students	4.05	2	5	4	5	-0.91	0.50
Random factors (e.g., bomb alarm)	4.02	2	5	4	4	-0.55	-0.50
Top-down legal regulations	4.03	1	5	4	4	-1.05	1.06
At the request of the students	3.81	1	5	4	5	-0.98	0.41
Due to your own convenience (e.g., going to a conference)	3.74	1	5	4	5	-0.56	-0.14

The lecturers indicated all the organizational forms of hybrid teaching that they experienced in the last semester. Most people dealt with typical distance learning, i.e., the lecturer conducted classes from home for students who were also in their own homes (56 people; 89%). A popular form was the teaching by a lecturer at the university when some students participated in them in person, and some remotely (46 people; 73%) or all students worked remotely (29 people; 46%). Less frequent forms of work were organizing some of the classes stationary, e.g. with an introduction to the topics, and some remotely, e.g. students' work (11 people; 17%); when the lecturer was at home and conducted classes for some students who were at home, and some at the university (9 people; 14%); or when lectures were held remotely and exercises and workshops stationary (6 people; 10%). Single indications concerned the lecturer conducting classes from home when the students were at the university (2 people) or the organization of lectures stationary, and the exercises remotely (1 person).

Academic teachers assessed the support in the field of hybrid teaching that they received or did not receive from university, marking the answer on a scale from 1 (definitely negative) to 5 (definitely positive). They assessed the support of their immediate supervisor most positively (M = 3.98), and above-average positively on the possibility of doing up for classes that have not been held remotely (M = 3.56). The possibility of renting the equipment (M = 3.33), technical support in the field of software (M = 3.31) and technical support in the field of equipment (M = 3.26) and the possibility of changing the date of classes (M = 3.25) were assessed rather positively. The possibility of changing the form of classes (M = 2.87) and the organization of substitutions (M = 2.80) was assessed rather negatively. Descriptive statistics are presented in Table II.

TABLE II
DESCRIPTIVE STATISTICS
ASSESSMENT OF LECTURERS' SUPPORT BY THE UNIVERSITY IN PARTICULAR SITUATIONS

	M	Min	Max	Me	Mo	Ske	K
Possibility to rent equipment	3.33	1	5	3	3	-0.30	-0.24
Software technical support	3.31	1	5	3	3	-0.43	-0.21
Hardware support	3.26	1	5	3	3	-0.25	-0.29
Possibility to change the form of classes	2.87	1	5	3	3	-0.13	-0.97
Possibility to change the date of classes	3.25	1	5	3	3	-0.44	-0.46
Organization of substitutions	2.80	1	5	3	3	-0.03	0.13
Support from the immediate supervisor	3.98	1	5	4	5	-0.52	-0.75
Doing up for classes that have not been held	3.56	1	5	3	3	-0.52	-0.48

Lecturers assessed selected elements of hybrid education, marking the answer on a scale from 1 (definitely low) to 5 (definitely high). They rated the highest in their involvement in the preparation and conduct of classes (M = 4.34) and the quality of their didactic work (M = 4.05). They assessed the level of achievement of the assumed learning outcomes as high (M = 3.47) above average, and the level of independence of students (M = 3.27) and the level of products of students (M = 3.26) were rated rather high. The level of student involvement was assessed as average (M = 3.11). Descriptive statistics are presented in Table III.

TABLE III
DESCRIPTIVE STATISTICS
LECTURERS' ASSESSMENT OF THE ELEMENTS
OF HYBRID EDUCATION

	M	Min	Max	Me	Mo	Ske	K
The level of independence of students	3.27	1	5	3	4	-0.45	-0.14
The level of student involvement	3.11	1	5	3	4	-0.69	-0.15
The level of quality of students' products	3.26	1	5	3	4	-0.54	-0.12
Level of achievement of the assumed learning outcomes	3.47	1	5	4	4	-0.64	0.68
The level of own involvement in the preparation and conduct of classes	4.34	2	5	4	4	-0.84	1.36
Quality level of own teaching work	4.05	2	5	4	4	-0.73	0.63

The teachers indicated the elements which, according to them, were missing for the effective implementation of hybrid education. The most numerous group indicated the lack of system solutions at the university level (21 people; 34%). There was also a lack of computer equipment in student houses (17 people; 27%), goodwill of students (16 people, 26%), and computer equipment at the university (15 people; 24%). Several people complained about the lack of IT competences among students (9 people; 15%) and lecturers (8 people; 13%), as well as the lack of goodwill of lecturers and computer equipment at the lecturer's home (2 people each; 3%). Every fourth lecturer (16 people; 26%) claimed that everything was fine and that nothing was missing.

The lecturers also assessed the effectiveness of selected elements of education (student involvement; student activity; contact with the lecturer; regularity of work; timely execution of tasks; quality of performed tasks; adequacy of the grades given; quality of education) depending on the teaching mode (traditional, hybrid, remote education). These elements are assessed similarly in each of the modes of education.

A. The scope of using hybrid education

Academics were also asked a few open questions. The first of them was as follows: For what and in what situations, excluding the pandemic situation, hybrid education can be used in academic education?

The teachers provided 99 responses in total. Three people didn't know how to answer that question and one didn't write anything. The categories of responses are listed in Table IV.

TABLE IV

THE MAIN CATEGORIES OF HYBRID EDUCATION APPLICATION
IN THE OPINION OF TEACHERS

Category	Number of responses	Percentage
Didactics	49	81.7
Training of academic teachers	18	30.0
Organizational matters	16	26.7
Health conditions	13	21.7
Other answers	3	5.0

TABLE V

ADVANTAGES OF HYBRID EDUCATION
IN THE OPINIONS OF ACADEMIC TEACHERS

Category	Number of responses	Percentage
Benefits	26	41.9
Organizational	25	40.3
Didactic	22	35.5
Taking care of the students' well-being	9	14.5
Health	8	12.9
Shaping students' attitudes	6	9.7

The surveyed teachers indicate didactics as the main applications of hybrid solutions: lectures (11 indications), various classes (statistics, workshops, exercises, some exercises) and diploma seminars (7 indications each), office hours (5 indications), consultations with students (4 indications), to verify the effects of education (exams, tests, collecting documentation) (3 indications), for subjects in which a computer is used and for part-time studies (3 indications each), internships, for disabled students, as a work tool for teachers from outside Poland (2 indications each).

The second category relates to organizational issues. Hybrid solutions make it possible to participate in classes in situations where it is not possible to travel to the university (absences as a result of events other than illness, random events, scientific trips, etc.) (10 indications), with homework (2 indications), around the holiday season and during meetings in order to quickly make a decision (after 1 indication).

The hybridity of technical solutions can also be used in the process of staff improvement: when organizing or participating in conferences (6 indications), in meetings (5 indications), in research projects (4 indications), and training (2 indications) and scientific seminars (1 indication).

For 13 teachers, it is desirable to use hybrid education during illness (7 indications), in pandemics (5 indications) and to ensure the safety of students (1 indication).

Three people gave a more general answer, indicating that it is possible to use hybrid education for the convenience of students and teachers, in the process of university democratization, and when it is possible to combine the strengths of remote and hybrid education.

The above list is illustrated by examples of statements of the surveyed teachers: "Hybrid education makes sense when part of the classes will be carried out stationary with showing and practicing the discussed material, and then the student's independent work, independent tasks or consultations." "I can imagine a hybrid education in which some classes are conducted stationary for everyone and some remotely for everyone - such a solution would even be beneficial for subjects that use computers." "Good for nothing. Comfortable for the absent, a torment for the lecturer. Total remote or total stationarity is better."

B. Advantages of hybrid education

Next, the question was asked what the most important advantages of hybrid teaching are. One person did not answer this question, three did not know what to answer. The response categories are summarized in Table V.

Most of the advantages of hybrid education are associated with various benefits (26). These include flexibility and comfort of lecturers and students (7 indications each), time and labor savings (6 indications), no need to travel to the university (5 indications) and no parking problems (1).

Organizational factors are also important (25). In this regard, the most important thing is the possibility of attending classes by people who cannot come to the university - which has a positive impact on attendance (15 responses). In addition, mobility (6 indications), the implementation of tasks in random situations (2 indications), and also (individual indications): continuity of classes and the possibility of personal contact are important.

The advantages related to didactics are equally important (22). Among them are the following: peace and freedom of conducting classes (3 recommendations); as well as (two indications each) access to electronic applications, the ability to collect materials and student works, faster and more efficient contact via MS Teams for some subjects, frequent contact with students during office hours, easier consultations, creating new didactic solutions, the possibility of sharing materials. Individuals wrote about: the oral exam, the effectiveness of the teaching process in a pandemic, easier identification of active students, remote shifts, and a positive impact on the quality of education.

The advantages also include those related to taking care of students (9 indications). These are a gesture of help towards students (5), accessibility for students (2) and adaptation to special educational needs (2).

The advantages also apply to health care (8 indications): health safety (7) and lower stress of lecturers (1).

The last category concerns the shaping of students' attitudes (6 indications): regularity (2) and (one indication each) group work, developing self-discipline, independence, and activity.

The above categories illustrate and enrich the exemplary descriptions: "It is flexible and allows for timely learning for people in isolation, in quarantine, who are not always related to the student's disease (may be related to someone's disease at home, where he lives, etc.)." "The remote-home situation allows for more individual contact with the student. During the stationary shifts, I have the impression that their attitude is that of 'applicants', and when both parties are at home it is somehow more pleasant."

C. Disadvantages of hybrid education

The disadvantages of hybrid education were also asked. Two people did not answer this question, one decided that they did not know, and three decided that there were no disadvantages of such a solution. The response categories are listed in Table VI.

TABLE VI
DISADVANTAGES OF HYBRID EDUCATION
IN THE OPINIONS OF ACADEMIC TEACHERS

Category	Number of responses	Percentage
Didactic	43	69.4
Social	26	41.9
Technical	11	17.7
Organizational	6	9.7

The biggest group of disadvantages of hybrid education mentioned by teachers are those related to didactics (39 indications). Among them, the most problematic is the lack or very little involvement of students (18 responses). Other disadvantages relate to the need to work in two modes (stationary and remote), lack of control and the ability to react to current problems (4 indications each). There were two indications for additional planning, performing double work and lower quality of student work. Single indications related to poor quality of education, difficulties in predicting the effects, static transfer of knowledge, difficulties in conducting classes with a large group, lack of responsibility of students for learning, violation of copyrights by students, the need to differentiate the topics of classes adequately to the form.

The surveyed teachers also found disadvantages of various social aspects related to hybrid education (26 responses). This applies to the lack of contact or its deterioration (18 indications), difficulties in obtaining group dynamics (4), weaker interactions (2), limitation or weakening of relationships, and the lack of equality in participation in classes (one indication each).

For 11 respondents, the disadvantage is the technical difficulties - both those related to hardware, software, and the Internet.

For six people, organizational issues are an important drawback: the lack of clear rules for such teaching, the limited scope of its application, organizational chaos, the need to work at the university with empty rooms, difficulties in setting the dates of distance and full-time classes, and the unpredictability of enabling the remote option.

Examples of statements illustrating the above categories include: "The need of a teacher to function in two orders at the same time. The teacher contacts people in the room differently than with those in MS Teams."; "Violating copyrights by recording and taking pictures of slides, students pretending to participate in classes"; "The work put into the on-site and online activities, the commitment is twofold."

D. Difficulties related to the implementation of hybrid education

Respondents were also asked about the difficulties that accompany hybrid education. Three people did not answer this question, two did not know how to answer. The remaining respondents gave a total of 79 responses, divided into 6 categories (Table VII).

TABLE VII
DIFFICULTIES IN HYBRID WORK
IN THE OPINIONS OF THE TEACHERS

Category	Number of responses	Percentage
Technical	24	38,71
Didactic	21	33,87
Related to the attitudes of students	12	19,35
Systemic and organizational	10	16,13
In the social dimension	8	12,90
Other	4	6,45

Most responses concern technical issues (24 responses).

There are many difficulties related to didactics (21 indications). These include lack of methodological competences (6), difficulties in carrying out some of the classes or tasks in this mode (4), planning classes (4), verification of both remote and stationary work of students (2), as well as (individual indications) - the necessity to preparation of instructions, organization of work in groups, maintaining discipline, difficulties related to the size of the groups, the inability to implement the planned elements.

The surveyed teachers also mention problems related to the attitudes of students and their home conditions (12). In particular, the problem is their involvement (6), and also (one indication each): student attitudes in general, lack of preparation, lack of motivation, lack of independence, low concentration, lack of space at home.

Teachers also notice systemic and organizational difficulties, which include: the lack of clear rules and procedures (5), chaos (2), the necessity to ask for consent to distance learning in the case of activities other than lectures, sudden changes, and low quality of education (one indication each).

Another category of difficulties relates to social issues (8 indications): lack of interaction (5), lack of contact with other people (2) and misunderstandings (1).

Other difficulties mentioned by the respondents include lack of acceptance or readiness to conduct such activities (2), uncertainty (1) and health problems (1).

The indicated difficulties are illustrated by examples of statements of the surveyed teachers: "Lack of a unified, simple way to use computers and Teams on the university (logging in, etc.); quite low quality of equipment; no software (movie playback) on some computers."; "No good network connections at the university." "Students do not join teams when they are invited, just when they are unable to attend classes. I have had many times when I received requests to join the team during the start of classes, which disorganized them a lot because instead of focusing on the start of the meeting, I had to approve requests."

E.   General remarks on hybrid education

In the end, teachers were free to comment on the solutions of hybrid education. There were voices full of acceptance and appreciation of the possibilities of this type of education ("I like this form"; "I positively assess the possibilities of online work") and critical voices ("failure and tragedy", "good way to destroy the university ethos"; "I believe that it significantly reduces the quality of education compared to full-time education").

Among such comments there were:

General remarks on the implementation of hybrid education:

Limiting hybridity only to emergency situations as a certain necessity, because "a solution for a longer time will generate an increasing fascination of academic education".

Recognizing the simultaneous implementation of both stationary and remote classes as an option that is "absolutely impossible, exposing the quality of teaching to a significant deterioration, and endangering the mental health of lecturers and students."

The belief is that there is a group of students who are indifferent to the form of work because they are very good at each of them and are very committed.

An appeal to introduce remote lectures on a permanent basis, especially in part-time studies.

Noting that the hybrid form is demanding, time-consuming and laborious. However, it is worth using it, because "it is a profitable effort due to the lack of breaks in education, quick online contact with students, efficient consultations and transfer of materials".

Leaving the option of being able to, and not forced, to choose this form of education.

Noticing the inequality of communication and activating students in traditional and distance education.

Notes on technical solutions: Appreciation of the unification of the medium for remote work (MS Teams) for the entire university: "Comparing remote work at The Maria Grzegorzewska University and at other universities, I think that it was brilliant to make a move to use one medium (Teams) in contacts with students and in conducting classes. I thank our Authorities for this kind of discipline."

Unification of the hardware and software available in the laboratories: "it is absolutely unacceptable that the employee learns what this particular computer possibilities and limitations are (which you should never borrow because you cannot cope in a given room) and how to make this particular equipment work in which room. It should be simple and the same everywhere."

Ensuring that teachers were not forced to bring their private computers and use their own Internet - and this was the only guarantee of reliability in the classroom.

Providing the possibility of renting a home university laptop for the duration of remote classes.

Improving the assistance provided by the media department: "Help from the employees of the media department was sometimes nonexistent or was associated with a significant loss of time allocated to classes."

Organizational considerations: An appeal to increase the level of trust in lecturers. Writing an official inquiry if you want to switch the form of one class to a remote one is frustrating and time-consuming.

Better, more transparent, and effective procedures for carrying out individual classes (rather than entire courses) remotely: "Sometimes we invite experts to classes, who find it easier to connect via MS Teams. Individual topics of classes are sometimes more effective remotely (working synchronously on common online tools, dividing into sub-assemblies, etc.)." In particular, the introduction of guidelines on who and when can use the hybrid form (on the students' side).

Appreciation of the introduction of one remote shift: "Students are much more willing and more likely to contact remotely."

Lack of understanding for non-uniform organizational solutions: "I do not understand the introduction of the remote formula for the last week of the semester and the main exam session, but not for the re-work exams."

V.   DISCUSSION

Research has shown that teachers are ready to undertake hybrid activities in specific situations in which a teacher or a student may find themselves. These include disease, isolation, and random factors. This readiness is revealed to a lesser extent when students ask for it or because of their own convenience. According to teachers, hybrid solutions can be used primarily in teaching, in particular in the implementation of lectures, exercises and diploma seminars, as well as in organizational activities and in the process of staff development.

The most common organizational form experienced by teachers was working when the lecturer was at the university and the students were at home, and when the lecturer was at the university, some students were at home and some at the university.

Teachers say that in the implementation of hybrid classes they receive support from their superiors, and in terms of the possibility of making up for missed classes. Among the advantages of this form of education, teachers see flexibility, comfort, and timesaving as well as the organizational and didactic possibilities that are associated with it.

On the other hand, among the disadvantages and difficulties are the attitudes of students and the need to conduct classes in two modes, which makes teaching activities difficult: social difficulties, including student and technical attitudes.

When assessing the implementation of hybrid education, they rate their work the highest - commitment and conduct of classes, as well as the quality of didactic work. The greatest difficulties were related to the lack of system solutions at the university and insufficient computer equipment at home and at the university, as well as the goodwill of students.

Compared to other modes, hybrid education is assessed similarly to remote and traditional forms. At the same time, it is not assessed unequivocally - there are extremely different opinions among the surveyed teachers - both appreciating it and significantly criticizing it.

Hybrid education understood as a combination of the advantages of stationary education with the advantages of remote education is the future of academic education. The experiences of two years of the pandemic and four semesters of crisis remote education are invaluable. They should be used to

improve the quality of education and support the teaching process. Returning to traditional education in the form it was before the pandemic would be to bury the opportunities for development and waste the acquired knowledge. The revolution in teaching and learning caused by the pandemic should be used to sustain an already initiated process of change. It is necessary to implement, test, evaluate and improve the proposed models of hybrid forms of education [20] and test the practice of operationalized theories of hybrid learning [21], as well as take advantage of the opportunities offered by, for example, augmented reality [22]. The hybrid approach is understood as a bridge between distance learning and classroom learning [23], allowing for the combination of the best features of both methods [24]. The use of distance and hybrid learning experiences obtained during the pandemic may contribute to updating and optimizing forms and methods of teaching, as well as redefining the role of the taught content [25].

The mode of conducting classes developed by the university authorities and teachers met the criteria of hybridism, as it combined educational styles that were apparently incompatible with each other, and in practice - complementary. Specific benefits are mentioned, resulting from the use of complementary education, such as personalization and individualization of students 'learning, optimization of academic teachers' working time and rationalization of the use of university infrastructure [26]. Moreover, the research showed that despite the shortcomings of the implemented solutions, The Maria Grzegorzewska University was ready to meet the needs of students. Thanks to the flexibility in the modes of conducting classes, it was possible to meet the educational needs of people in isolation and in quarantine. What's more, during the semester there were also applications from students for the possibility of pursuing hybrid classes due to poor mental state or a threatened pregnancy. This confirms the usefulness and adequacy of hybrid solutions in random situations or those that make it difficult to systematically participate in classes at the university.

A. Recommendations

On the basis of the results obtained in the research, several recommendations can be formulated related to the use of the form of hybrid education [27]: Planning "lecture days" and delivering lectures remotely, especially during part-time studies. Enabling lecturers to make decisions about conducting individual classes remotely in specific cases (e.g., when these are the only classes of students on a given day because the rest has been canceled), without the need to submit applications. Allowing to conduct some of the hours of computer subjects remotely. Maintaining the implementation of at least one on-call shift in an online form and maintaining the possibility of conducting the diploma seminar in a form of your choice (remote, stationary or hybrid). Specifying the rules (introducing transparent criteria) for the use of hybrid solutions for students, e.g., with special educational needs or in a special health situation. Maintaining the possibility of using a uniform IT system for all, both as a place for providing students with materials and assigning tasks, as well as a platform for lecturer-student contact and lecturers with each other.

REFERENCES

[1] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Zdalna edukacja kryzysowa w APS w okresie pandemii COVID-19," Warszawa, 2020. https://doi.org/10.13140/RG.2.2.18059.52006

[2] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Crisis Remote Education at The Maria Grzegorzewska University During Social Isolation in the Opinions of Academic Teachers," *International Journal of Electronics and Telecommunications, 66 (4),* 2020, pp. 801-806, https://doi.org/10.24425/ijet.2020.135673

[3] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Crisis Remote Education at The Maria Grzegorzewska University During Social Isolation in the Opinions of Students." *International Journal of Electronics and Telecommunications, 66 (4),* 2020, pp. 807-812, https://doi.org/10.24425/ijet.2020.135675

[4] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Crisis Remote Education From The Perspective of One Year Experience of Students," *International Journal of Electronics and Telecommunications, 67 (2),* 2021, pp. 221-227, https://doi.org/10.24425/ijet.2021.135968

[5] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Zdalna edukacja kryzysowa w APS w okresie pandemii COVID-19. Z perspektywy rocznych doświadczeń," Warszawa, 2020. https://doi.org/10.13140/RG.2.2.10251.62243

[6] M. W. Romaniuk, J. Łukasiewicz-Wieleba and S. Kohut, "Nauczyciele akademiccy wobec kryzysowej edukacji zdalnej,, *E-Mentor*, 5 (87), 2020, pp. 15-26, https://doi.org/10.15219/em87.1489

[7] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Crisis Remote Education From The Perspective of One Year Experience of Academic Teachers," *International Journal of Electronics and Telecommunications, 67 (2),* 2021, pp. 213-219, https://doi.org/10.24425/ijet.2021.135967

[8] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Remote and Stationary Examinations in the Opinion of Students," *International Journal of Electronics and Telecommunications,* vol. 68, no. 1, pp. 69-75, 2022, https://doi.org/10.24425/ijet.2022.139850

[9] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Challenges of administering university examinations remotely during the COVID-19 pandemic," *E-Mentor,* 3 (90), 2021, pp. 22-31, https://doi.org/10.15219/em90.1519

[10] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Zdalna edukacja kryzysowa w APS w okresie pandemii COVID-19. Proces egzaminowania w trybie zdalnym i stacjonarnym – porównanie," Warszawa, 2021, https://doi.org/10.13140/RG.2.2.18440.55045

[11] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Academic Lecturers Towards the Students' Examining. Similarities and Differences of Stationary and Remote Exams in the Pandemic Era," *International Journal of Electronics and Telecommunications,* vol. 68, no. 1, pp. 63-68, 2022, https://doi.org/10.24425/ijet.2022.139849

[12] A. Siegelman, "Blended, hybrid, and flipped courses: What's the difference?, " 2019. [Online]. Available: https://teaching.temple.edu/edvice-exchange/2019/11/blended-hybrid-and-flipped-courses-what%E2%80%99s-difference.

[13] A. Heinze and C. Procter, "Reflections On The Use Of Blended Learning," 2004. [Online]. Available: http://usir.salford.ac.uk/id/eprint/1658/1/.

[14] H. Staker and M. B. Horn, "Classifying K–12 Blended Learning," Innosight Institute, www.christenseninstitute.org/wp-content/uploads/2013/04/Classifying-K-12-blended-learning.pdf, 2012.

[15] D. Janczak, "Hybrydowe? nauczanie, uczenie się a może kształcenie... czyli jak to jest z tą hybrydą w edukacji, " *Dydaktyka edukacji hybrydowej,* pp. 1-7, 2020.

[16] J. Paul and F. Jefferson, "A Comparative Analysis of Student Performance in an Online vs. Face-to-Face Environmental Science Course From 2009 to 2016, " *Frontiers in Computers Science,* pp. 1-7, 2019, https://doi.org/10.3389/fcomp.2019.00007

[17] R. Garrison and H. Kanuka, "Blended learning: Uncovering its transformative potential in higher education, " *The Internet and Higher Education,* vol. 7, no. 2, pp. 95-105, 2004, https://doi.org/10.1016/j.iheduc.2004.02.001

[18] A. P. Rovai and H. M. Jordan, "Blended Learning and Sense of Community: A Comparative Analysis with Traditional and Fully Online Graduate Courses," *The International Review of Research in Open and Distributed Learning,* vol. 5, no. 2, 2004, https://doi.org/10.19173/irrodl.v5i2.192

[19] K. Olapiriyakul and J. M. Scher, "A guide to establishing hybrid learning courses: Employing information technology to create a new learning experience, and a case study, " *The Internet and Higher Education,* vol. 9, no. 4, p. 287–301, 2006, https://doi.org/10.1016/j.iheduc.2006.08.001

[20] S. F. Shetu, M. Rahman, A. Ahmed, M. F. Mahin, A. U. Akib and M. Saifuzzaman, "Impactful e-learning framework: A new hybrid form of education, " *Current Research in Behavioral Sciences,* vol. 2, p. 100038, 2021, https://doi.org/10.1016/j.crbeha.2021.100038

[21] R. T. Nørgård, "Theorising hybrid lifelong learning, " *British Journal of Education Technology,* vol. 52, no. 4, pp. 1709-1723, 2021, https://doi.org/10.1111/bjet.13121

[22] A. Alam, "Designing XR into Higher Education using Immersive Learning Environments (ILEs) and Hybrid Education for Innovation in HEIs to attract UN's Education for Sustainable Development (ESD) Initiative, " in *2021 International Conference on Advances in Computing, Communication, and Control (ICAC3)*, Mumbai, India, 2021, https://doi.org/10.1109/ICAC353642.2021.9697130

[23] S. Potra, A. Pugna, M.-D. Pop, R. Negera and L. Dungan, "Facing COVID-19 Challenges: 1st-Year Students' Experience with the Romanian Hybrid Higher Educational System, " *International Journal of Environmental Research and Public Health,* vol. 18, no. 6, p. 3058, 2021, https://doi.org/10.3390/ijerph18063058

[24] J. Singh, K. Steele and L. Singh, "Combining the Best of Online and Face-to-Face Learning: Hybrid and Blended Learning Approach for COVID-19, Post Vaccine, & Post-Pandemic World, " *Journal of Educational Technology Systems,* vol. 50, no. 2, pp. 140-171, 2021, https://doi.org/10.1177/00472395211047865

[25] K. Saichaie, "Blended, Flipped, a.nd Hybrid Learning: Definitions, Developments, and Directions, " *New Directions for Teaching and Learning,* no. 164, pp. 95-104, 2020, https://doi.org/10.1002/tl.20428

[26] A. Bronk, R. Maciołek, J. M. Mischke, A. Nowak, A. K. Stanisławska, P. Stencel, J. Urbaniec, A. Wodecki and W. Zieliński, "Jeśli blended learning na uniwersytecie, to jaki? Dyskusje o..., " *e-mentor,* vol. 1, no. 13, pp. 16-21, 2006.

[27] M. W. Romaniuk and J. Łukasiewicz-Wieleba, "Zdalna edukacja kryzysowa w APS w okresie pandemii COVID-19. Edukacja hybrydowa," Warszawa, 2022, https://doi.org/10.13140/RG.2.2.30338.35524