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# Teaching Style, Coping Strategies, Stress and Social Support: Associations to the Medical Students' Perception of Learning during the SARS-CoV-2 Pandemic

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**Abstract:** This study assessed the learning perception of undergraduate medical students on three types of teaching (classical/online/hybrid), in relation to coping strategies, stress, and social support, in the context of the SARS-CoV-2 pandemic. Additionally, we explored gender differences and the perceived usefulness of teaching. 201 students (48 men, 153 women; mean age = 22.900, SD = 2.830) participated in the study. They answered a Multidimensional Scale of Perceived Social Support, a Brief Cope Scale, a Student-life Stress Inventory, a visual analog scale for usefulness, and a survey collecting their perceptions about learning across teaching types. Results point out a preference for classical teaching, followed by the hybrid and online formats. Online teaching was identified as more advantageous in terms of time management and seeking information. Denial and substance use were statistically associated with poor communication, bad time using, and impaired learning. Both stress and social support had ambivalent associations with learning perceptions. Gender differences were limited to behavioral disengagement and higher social support perceived by women. Although classical teaching was globally perceived as the most useful, online teaching was considered desirable by male urban respondents. These data may contribute to the strategic growth and refinement of web-based teaching methods in medical universities.

**Keywords:** learning; perceived stress; perceived social support; coping; pandemic; SARS-CoV-2



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## 1. Introduction

Academic stress represents one of the most important issues of concern in medical schools. A lot of external circumstances account for this phenomenon, including the large study curriculum and the long duration of studies [1,2], the frequent and difficult examinations [3,4], the lack of control over the academic environment [5,6], the low perceived social support [7,8] and the ineffective coping strategies of many undergraduate students [9,10]. The expression of stress may remain in some cases obscure or be different as expected, making its early detection a real challenge, especially in vulnerable groups [11–14]. If not addressed, academic stress may significantly increase exhaustion, alienation, decrease motivation and alter the perception of learning, these potentially evolving into a well-definite burnout syndrome at the end of studies or at the beginning of the professional career [15–17]. Counseling [18], classic psychotherapy (e.g., cognitive-behavioral therapy, assertive training, or mindfulness) [19–21], as well as self-help assemblies (such as Balint groups) [22–24] have been used as viable tools to address academic stress; however, their implementation is not systematic. This is partly explained by the particular organizational context of medical universities [25,26], but also by the incomplete clarification of the rela-

tionships between the variables contributing to the students' perception of academic stress and their investment in learning.

In this already-complicated landscape, the abrupt occurrence of the SARS-CoV-2 pandemic in 2020 additionally increased the strain put on all those involved in academic teaching (be them students, faculty, or organizational structures). In the particular case of undergraduates, many of them exhibited a substantial increase in depression and anxiety [27–29], with medical students seeming to be among the most affected. Potential reasons for this include the substantial decrease in clinical hours, the mandatory isolation and social distancing, the decrease in their economic resources, and the uncertainty about the possibility of finishing their studies [30].

One way of counter-attacking this peril is represented by the implementation and development of a new kind of education, more focused on the use of digital technologies. This includes the introduction of new tools for delivering online and hybrid teaching [31,32], but also new formats, such as online teleconferences and webinars. They can all have important advantages in the restricted mobility conditions specific to the pandemic, allowing students to acquire "interpersonal education" [33], flexibly to attend the educational sessions from any location, and helping clinical departments to deliver a variety of educational sessions via reports, case discussions, or journal clubs [34–36]. Moreover, being designed from scratch, they could consider aspects reported by a significant amount of students to be critical for feeling satisfied in the academic environment. This includes personalization of education, inclusiveness, stimulation of creativity, ensuring resources for success and lessons for the long-term [37].

Despite these great efforts, the students' amount of adjustment to the new educational technologies remains controversial, and the literature reports regarding their benefits-costs ratio are still new and, to a certain point, ambivalent [38–43]. In this respect, one distinct question that needs to be assessed is the evaluation of the impact of online and hybrid teaching on those variables that are known to directly impact the perception of learning, and notably on coping strategies, stress, and social support [44–47]. In this sense, being a student during the pandemic may have increased the impact of stress and also diversify its sources. As far as coping strategies are concerned, they may have changed, for example, from more problem-focused coping towards emotion-focused coping. Similarly, the delivering of social support commuted from a direct to a virtual pathway, while the balance between emotional, instrumental, and material support may have also been transformed. As a whole, the perception of learning could differ substantially, as far as online and hybrid teaching are concerned, compared to the classical variant of teaching.

Part of these perceptions and relationships are already described in very recent literature regarding academic adjustment in the pandemic [48–53]. Still, one should notice that this is a very new research field, with a lot of space for investigation. In this sense, our study is the first to explore Romanian undergraduate medical students' perception of the new types of teaching and their impact. Specifically, it aims to explore the perspective of undergraduate medical students in relation to their coping strategies, stress, and social support. Additionally, we investigated the gender differences of the quantitative variables taken into account in this study and the perceived usefulness of teaching, taken separately for classical, online, and hybrid teaching.

## 2. Materials and Methods

### *2.1. Design*

The design of the study was cross-sectional, with a single administration of a survey comprising 11 questions and a series of standardized psychometric instruments. The use of the cross-sectional design was preferred, given the various profiles of students' exposure, across different classes and study years, to the three types of teaching taken into consideration in the study. Moreover, the cross-sectional design was successfully used in previous literature on the same theme [43], including in Romania [54,55].

### 2.2. Participants

The study included undergraduate students undergoing their training in the University of Medicine "Carol Davila"—Bucharest. 201 students (48 men, 153 women; mean age = 22.900, SD = 2.830) agreed to participate in the study. All participants met the inclusion criteria, set as (1) being at least 19 years of age and having the status of current undergraduate students in the abovementioned institutions, and (2) having a personal experience, in the context of the pandemic and previously, of at least two classes taught and finalized in each of the classical, online, and hybrid teaching formats. Exclusion criteria were represented by (1) current self-reported somatic or psychiatric morbidity, (2) cognitive deficits or any other impairments which would render the understanding and completion of the study questionnaires difficult, (3) lack of completion of one or more study instruments, and (4) no personal experience with all three teaching formats taken into account in this study.

### 2.3. Context and Procedure

The institutional e-learning platform was created in the university in March 2020. Basic instructions and training sessions were run for teachers and students about how to deploy online teaching. At the time of the study (March–May 2021), the online teaching platform had already been used for a year.

In terms of format, the online teaching was performed through Google Meet® or Zoom® sessions, allowing lectures, interactive real-time feedback from students, dissemination of group tutorials, and video presentations of clinical cases.

Considering the evolution of the pandemic and the more relaxed epidemiological measures, in Fall 2020, a hybrid educational system was proposed and applied. This was initiated at the beginning of the first semester (for several preclinical disciplines) and at the beginning of the clinical modules (for clinical disciplines). Hybrid teaching comprised online classes (lectures) and face-to-face classes (seminars, clinical internships) in which students participated in smaller groups in compliance with prevention measures, especially those referring to social distancing.

For this study, the data were gathered in March–May 2021 through the administration of an online set of questions containing the study instruments. To launch the research, we sent a preliminary email to UMFCD students, informing them of the study's aims and soliciting their participation. Participation was anonymous, and students' responses did not affect the teacher's evaluation of students' performance. The students who expressed interest in participating received an explanatory statement about the study and completed informed consent forms. Subsequently, they were sent the web link for answering the psychometric instruments and the survey.

The study procedure was run via a Google Forms® interface (Google LLC, Mountain Vue, CA, USA). The choice of the online format was preferred, not only because of the objective conditions in which this research was run (i.e., the COVID-19 restrictions concerning social distancing) but also considering previous research in this area [33,43]. Furthermore, online testing in educational settings is reported to ensure speed, timeliness, flexibility, and representativeness of the collected data [56].

Procedures in the study were designed in accordance with the World Medical Association Declaration of Helsinki. The study protocol was approved by the UMFCD Institutional Review Board (no. 7872/2021). A researcher (CGI) was available by phone or email in case the participants had questions concerning the filling of the questionnaires. All responses were processed anonymously, and a numerical code was assigned for each participant. The collected data were accessible exclusively to study researchers (OPV, CAP, CGI, AM, LVD), while regular didactic staff had no access to the nominal distribution, collection, or interpretation of questionnaires. The interpretation of the questionnaires was performed independently by two researchers (CAP, CGI) and cross-checked for congruence afterward. Final results were included in an SPSS 21 (SPSS® Inc., Chicago, IL, USA) database.

### 2.4. Instruments

All participants answered three standardized psychometric instruments in order to measure their self-evaluation of social support, coping strategies, and perceived stress.

(1) Multidimensional Scale of Perceived Social Support (MSPSS) [57] is a brief research tool designed to measure perceptions of support from family, friends, and significant others. It comprises 12 questions, with seven variants of answers for each of them, from 1 ("totally disagree") to 7 ("totally agree"). Across literature studies, the MSPSS has been shown to have good internal consistency (0.80–0.84), good validity, and a fairly stable factorial structure [57,58], being also previously used and validated in the Romanian population [59,60].

(2) Brief COPE Scale contains 28 items, which measure 14 distinct coping strategies [61]. The answers are graded on a 4-point Likert scale from 1 = "I haven't been doing this at all" to 4 = "I have been doing this a lot". The test has generally been reported to have good reliability (0.50–0.90) [62] and is validated in the Romanian population.

(3) Student-life Stress Inventory (SSI) is an instrument measuring the student's academic stress and reactions to stressors. The test contains 51 items from five stress categories (frustrations, conflicts, pressures, changes, and self-imposed reactions to stressors), to which the respondent answers on a 5-point Likert-type scale. The items are summed for each subscale to obtain a total score [63]. The reliability and validity of this test are satisfactory [64]. It was also previously used for evaluation in the Romanian academic population [65].

The perception of learning was assessed through a survey with 11 distinct questions relevant for the impact of teaching type on four distinct domains (communication with peers and professors, time management, learning abilities, and perception of exams and academic achievement).

The specific questions administered in the survey were the following:

1. "I am satisfied about the communication with my professors";
2. "I am satisfied about the communication with my colleagues";
3. "I effectively use my time";
4. "I understand better the courses and the seminars";
5. "I can easily seek for information";
6. "I learn easily";
7. "I can dispose time for hobbies and other enjoyable activities";
8. "I can better plan my time";
9. "I can focus my attention";
10. "I am capable of reaching good grades";
11. "I perceive the exams as being difficult".

For each of the abovementioned questions, the respondents expressed their agreement or, respectively, disagreement with their content by using a dichotomic scale ("yes" = 1 vs. "no" = 0). This applied to each of the teaching types (classical, online, and hybrid) experienced by the respondents before.

In addition to these four psychometric instruments, the respondents provided information about their age at the time of the testing, their place of origin (urban/rural), the academic year in which they were enrolled, and a subjective global assessment about the usefulness of classical, online and hybrid teaching, expressed on a visual analog scale, with values from 0 ("not at all useful") to 100 ("the highest usefulness possible").

### 2.5. Data Analysis

Descriptive analysis included the computing of means and standard deviations of the demographic and psychological quantitative variables included in the study, while for qualitative variables (including the answers at the study survey), a distribution of frequency was realized.

Firstly, the statistical analysis included the computing of non-parametric Wilcoxon tests for assessing the two-by-two differences between the classic-online, online-hybrid, and classic-hybrid teaching, for each survey question. Next, a multinominal logistic regression was run to identify the predictors of learning perception, separately by each survey question. Later, a series of *t*-tests for independent samples were run in order to assess the gender differences of the quantitative variables taken into account in this study. Finally, in what the usefulness of teaching was concerned, we run *t*-tests for dependent samples to evaluate the comparative scores for each type of teaching and a MANOVA analysis to identify its predictors. Throughout statistical analyses, missing data were handled through listwise deletion. For all calculations, the threshold of statistical significance was $p < 0.05$.

## 3. Results

### 3.1. Descriptive Data

Tables 1 and 2 offer a summary of the biographical characteristics of participants, as well as a description of the psychosocial variables measured in the study.

The majority of respondents were young women of urban origin and placed in the educational cycle towards the end of their studies. Among the coping styles used by participants, the most frequent were humor, active coping, the use of religion, and acceptance, while the least used were substance use, use of instrumental support, and denial.

### 3.2. Perception of Learning

Table 3 illustrates the comparative views of respondents regarding the three different types of teaching (classical/online/hybrid) and their statistical significance.

The significant predictors of learning perception, by types of teaching, are figured in Table 4.

In terms of communication (survey's questions 1 and 2), classical teaching was not associated with any predictor facilitating the communication with professors. In contrast, communication with professors was perceived as improving, as the number of semesters taught online was higher ($p < 0.02$). For students attending the hybrid system, the communication with professors was facilitated by being male ($p < 0.038$) and was inhibited by the incapacity of planning ($p < 0.025$). Regarding communication with peers, this was predicted in the classical type of teaching by venting ($p < 0.033$) and negatively by substance use ($p < 0.001$). Online teaching was not associated with any predictor of peer communication, while hybrid teaching was associated with self-distraction ($p < 0.01$).

**Table 1.** Descriptive data (biographical variables).

| Biographical Variables | | n | % |
|---|---|---|---|
| Gender | Men | 48 | 23.880 |
| | Women | 153 | 76.120 |
| Origin | Urban | 186 | 92.537 |
| | Rural | 15 | 7.463 |
| Study year | First | 16 | 7.960 |
| | Second | 27 | 13.432 |
| | Third | 25 | 12.437 |
| | Fourth | 16 | 7.960 |
| | Fifth | 44 | 21.891 |
| | Sixth | 73 | 36.318 |
| Age | | 22.900 * | 2.830 ** |

* mean, ** standard deviation.

**Table 2.** Descriptive data (psychosocial variables).

| Psychosocial Variables | | Mean | Standard Deviation |
|---|---|---|---|
| Coping style | Self-distraction | 5.766 | 1.496 |
| | Active coping | 6.542 | 1.303 |
| | Denial | 3.512 | 1.587 |
| | Substance use | 2.955 | 1.625 |
| | Use of emotional support | 5.621 | 1.698 |
| | Use of instrumental support | 3.243 | 1.485 |
| | Behavioral disengagement | 5.835 | 1.687 |
| | Venting | 5.905 | 1.692 |
| | Positive reframing | 5.781 | 1.600 |
| | Planning | 5.840 | 1.501 |
| | Humor | 6.830 | 1.204 |
| | Acceptance | 6.263 | 1.745 |
| | Religion | 6.572 | 1.189 |
| | Self-blame | 4.164 | 2.048 |
| Perceived stress | | 149.308 | 27.035 |
| Perceived social support | | 5.677 | 1.325 |

**Table 3.** Respondents' comparative views about types of teaching.

| Affirmative about . . . | Classic | | Online | | Hybrid | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| . . . good communication with professors * | 134 | 66.66 | 15 | 7.46 | 44 | 21.89 |
| . . . good communication with peers * | 177 | 80.06 | 5 | 2.48 | 43 | 21.39 |
| . . . effectiveness of time using ** | 73 | 36.32 | 183 | 91.05 | 162 | 80.6 |
| . . . understanding of courses and seminars * | 135 | 67.14 | 29 | 14.42 | 59 | 29.35 |
| . . . easy seeking of information * | 24 | 11.94 | 128 | 63.68 | 84 | 41.79 |
| . . . easiness of learning *** | 82 | 40.79 | 44 | 21.89 | 57 | 28.35 |
| . . . time for hobbies and other enjoyable activities * | 10 | 4.97 | 155 | 77.11 | 103 | 51.24 |
| . . . time planning ** | 51 | 25.37 | 99 | 49.25 | 90 | 44.77 |
| . . . attention focusing • | 133 | 66.17 | 23 | 11.44 | 42 | 20.89 |
| . . . capability to reach good grades | 46 | 22.88 | 48 | 23.88 | 41 | 20.39 |
| . . . perception of exam as being difficult # | 21 | 10.44 | 66 | 32.83 | 26 | 12.93 |

C = classic teaching, O = online teaching, H = hybrid teaching. * $p < 0.001$ (C-O, O-H, C-H); ** $p < 0.001$ (C-O, C-H), $p < 0.01$ (O-H); *** $p < 0.001$ (C-O), $p < 0.01$ (C-H); • $p < 0.001$ (C-O, C-H), $p < 0.003$ (O-H); # $p < 0.001$ (C-O, O-H).

**Table 4.** Predictors of learning perception, by types of teaching (multinominal logistic regression) *.

| Type of Teaching | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Classical | | | Online | | | Hybrid (Classical + Online) | | |
| Predictor | Beta | *p* | Predictor | Beta | *p* | Predictor | Beta | *p* |
| 1. Communication with professors | | | | | | | | |
| | | | Behavioral disengagement | 0.640 | 0.021 | Planning | −0.365 | 0.025 |
| | | | Number of semesters | 1.207 | 0.020 | Gender (male) | 0.928 | 0.038 |

**Table 4.** *Cont.*

| Type of Teaching | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Classical** | | | **Online** | | | **Hybrid (Classical + Online)** | | |
| **Predictor** | **Beta** | ***p*** | **Predictor** | **Beta** | ***p*** | **Predictor** | **Beta** | ***p*** |
| 2. Communication with peers | | | | | | | | |
| Substance use | −0.578 | 0.001 | | | | Self-distraction | 0.416 | 0.010 |
| Venting | 0.565 | 0.033 | | | | | | |
| 3. Effectiveness of time using | | | | | | | | |
| Active coping | 0.507 | 0.014 | Perceived stress | 0.031 | 0.023 | Self-distraction | −0.490 | 0.003 |
| Substance use | −0.273 | 0.036 | | | | Positive reframing | −0.381 | 0.025 |
| Planning | −0.343 | 0.022 | | | | Preclinical | 1.113 | 0.010 |
| Humor | −0.563 | 0.009 | | | | | | |
| 4. Understanding of courses and seminars | | | | | | | | |
| Substance use | −0.274 | 0.019 | Self-distraction | −0.397 | 0.027 | | | |
| | | | Denial | −0.575 | 0.009 | | | |
| | | | Use of emotional support | 0.595 | 0.017 | | | |
| 5. Easy seeking of information | | | | | | | | |
| Active coping | 0.614 | 0.044 | | | | | | |
| Use of instrumental support | 0.494 | 0.035 | | | | | | |
| Humor | −1.032 | 0.002 | | | | | | |
| Religion | 0.915 | 0.013 | | | | | | |
| 6. Easiness of learning | | | | | | | | |
| Venting | 0.405 | 0.011 | Self-distraction | −0.485 | 0.002 | Number of semesters | 0.679 | 0.041 |
| | | | Social support | 0.997 | 0.033 | | | |
| | | | Preclinical | −0.985 | 0.036 | | | |
| 7. Time for hobbies and other enjoyable activities | | | | | | | | |
| Acceptance | 1.269 | 0.049 | Active coping | −0.490 | 0.041 | Number of semesters | 0.629 | 0.038 |
| | | | Use of emotional support | 0.446 | 0.019 | | | |
| | | | Use of instrumental support | −0.326 | 0.049 | | | |
| | | | Humor | 0.502 | 0.037 | | | |
| | | | Gender (female) | −0.983 | 0.028 | | | |
| 8. Time planning | | | | | | | | |
| | | | | | | Planning | 0.275 | 0.047 |
| 9. Attention focusing | | | | | | | | |
| Behavioral disengagement | 0.326 | 0.011 | Self-distraction | −0.556 | 0.011 | | | |
| | | | Denial | −0.703 | 0.027 | | | |
| | | | Use of instrumental support | −1.036 | 0.024 | | | |
| | | | Perceived stress | 0.032 | 0.013 | | | |

**Table 4.** *Cont.*

| Type of Teaching | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Classical** | | | **Online** | | | **Hybrid (Classical + Online)** | | |
| **Predictor** | **Beta** | ***p*** | **Predictor** | **Beta** | ***p*** | **Predictor** | **Beta** | ***p*** |
| 10. Capability to reach good grades | | | | | | | | |
| Perceived stress | 0.019 | 0.033 | Preclinical | −0.925 | 0.032 | Use of instrumental support | −0.468 | 0.017 |
| 11. Perception of exams difficulty | | | | | | | | |
| Number of semesters | −0.385 | 0.037 | Behavioral disengagement | −0.289 | 0.025 | Use of emotional support | −0.567 | 0.018 |
| | | | Positive reframing | −0.497 | 0.001 | Venting | 0.490 | 0.035 |
| | | | Planning | 0.376 | 0.013 | Positive reframing | −0.425 | 0.040 |
| | | | Self-blame | 0.204 | 0.026 | Planning | 0.571 | 0.012 |
| | | | Perceived stress | 0.017 | 0.048 | Perceived stress | 0.033 | 0.016 |

* only statistically significant correlations are figured.

Time using (survey's questions 3, 7, and 8) was positively predicted in classical teaching by active coping ($p < 0.014$) and negatively by substance use ($p < 0.036$), use of humor ($p < 0.009$) and planning ($p < 0.022$). Acceptance had a positive impact only on time for hobbies ($p < 0.049$). For online teaching, time using was proportional to the perception of stress ($p < 0.023$). The ability of spending time on hobbies was predicted positively in this type of teaching by male gender ($p < 0.028$), the use of emotional support ($p < 0.019$), instrumental support ($p < 0.049$) and humor ($p < 0.037$), and negatively by active coping ($p < 0.041$). In the hybrid teaching, positive reframing ($p < 0.025$) and self-distraction ($p < 0.003$) had a negative impact on time using, while the preclinical position in the study cycle was a positive one ($p < 0.010$). The number of semesters in this type of teaching had a positive impact on the time spent on hobbies ($p < 0.038$).

Regarding cognitive abilities (learning/understanding/seeking information/focusing attention) (survey's questions 4, 5, 6, and 9), they were predicted in classical teaching by problem-focused strategies (active coping: $p < 0.044$, use of instrumental support: $p < 0.035$), but also by emotion-focused strategies (religion: $p < 0.013$, venting: $p < 0.11$). Substance use and humor were identified to be negative predictors ($p < 0.019$ and $p < 0.002$, respectively). In the online type of teaching, self-distraction and denial had a negative predictive effect ($p < 0.002$ and $p < 0.027$). Interestingly, perceived stress had a positive impact on focusing attention ($p < 0.013$), while social support had an ambivalent effect, with emotional support playing a role in a better understanding of courses and seminars ($p < 0.017$), and general support in learning ($p < 0.033$). On the contrary, instrumental social support had a negative impact on focusing attention ($p < 0.024$). Preclinical students benefited more than clinical students in this type of teaching ($p < 0.036$). Finally, hybrid teaching was predicted only by the number of semesters ($p < 0.041$).

In what concerned the perception of exams and academic achievement (survey's questions 10 and 11), in classical teaching, the higher number of semesters was correlated to a lower perception of exam difficulty ($p < 0.037$), while perceived stress had an opposite effect ($p < 0.033$). In online teaching, exam difficulty was perceived as directly proportional to the perception of stress ($p < 0.048$), use of self-blame ($p < 0.026$), and planning ($p < 0.013$), and reversely related to behavioral disengagement ($p < 0.025$) and positive reframing ($p < 0.001$). Moreover, clinical students reported a higher ability to reach better grades compared to preclinical students ($p < 0.032$). Hybrid teaching was characterized by a negative predictive value in getting better grades played by the use of instrumental social support ($p < 0.017$). Positive reframing and the use of emotional social support diminished

the perceived difficulty of exams ($p < 0.040$ and $p < 0.018$, respectively). Similarly to online teaching, planning was ineffective in decreasing the perception of exams' difficulty ($p < 0.012$). Venting had an identical effect ($p < 0.035$). Perceived stress was a significant predictor for perceiving the exams as difficult ($p < 0.016$).

### 3.3. Gender Differences

The overview of the significant gender differences found among the quantitative study variables is depicted in Table 5.

**Table 5.** Gender differences (*t*-test for independent variables) *.

| Characteristics | | Gender | N | Mean | SD | t | df | *p* |
|---|---|---|---|---|---|---|---|---|
| Behavioral disengagement | | Male | 48 | 5.416 | 1.673 | 1.987 | 199 | 0.048 |
| | | Female | 153 | 5.967 | 1.675 | | | |
| Social support | Total | Male | 48 | 5.305 | 1.500 | 2.248 | 199 | 0.026 |
| | | Female | 153 | 5.794 | 1.248 | | | |
| | Partner | Male | 48 | 5.296 | 1.971 | 2.123 | 199 | 0.035 |
| | | Female | 153 | 5.906 | 1.657 | | | |
| | Friends | Male | 48 | 5.083 | 1.527 | 2.017 | 199 | 0.045 |
| | | Female | 153 | 5.602 | 1.565 | | | |

* only statistically significant differences are figured.

Behavioral disengagement was significantly higher in women ($p < 0.048$). Moreover, women reported higher scores in total support ($p < 0.026$), but also in the support received from partners ($p < 0.035$) and friends ($p < 0.05$).

### 3.4. Perceived Usefulness of Teaching (Classical/Online/Hybrid)

The most useful type of teaching was considered the classical one (mean = 87.562, SD = 13.828), followed by the hybrid format (mean = 67.164, SD = 20.986) and the online format (mean = 50.448, SD = 20.791). The differences between these values were statistically significant ($p < 0.001$).

The predictors for the usefulness of teaching were comparatively assessed through MANOVA. The statistically significant results are figured in Table 6.

**Table 6.** Predictors of perceived usefulness of teaching (classic, online, hybrid) (MANOVA).

| Source | Perceived Usefulness of Teaching | Type III Sum of Squares | df | Mean Square | F | *p* |
|---|---|---|---|---|---|---|
| Denial | Classic | 5.027 | 1 | 5.027 | 9.043 | 0.003 |
| | Online | 0.105 | 1 | .105 | 0.095 | 0.758 |
| | Hybrid | 1.114 | 1 | 1.114 | 0.981 | 0.323 |
| Use of instrumental support | Classic | 2.744 | 1 | 2.744 | 4.936 | 0.028 |
| | Online | 0.803 | 1 | 0.803 | 0.728 | 0.395 |
| | Hybrid | 0.565 | 1 | 0.565 | 0.497 | 0.482 |
| Origin | Classic | 3.019 | 1 | 3.019 | 5.431 | 0.021 |
| | Online | 0.443 | 1 | 0.443 | 0.401 | 0.527 |
| | Hybrid | 3.408 | 1 | 3.408 | 2.999 | 0.085 |
| Gender × origin | Classic | 0.902 | 1 | 0.902 | 1.623 | 0.204 |
| | Online | 4.935 | 1 | 4.935 | 4.476 | 0.036 |
| | Hybrid | 0.329 | 1 | 0.329 | 0.289 | 0.591 |

Classical teaching had the most predictors, with denial and the use of instrumental support displaying a negative influence on the perceived usefulness of teaching ($p < 0.003$ and 0.028, respectively). An opposite influence was played by rural origin ($p < 0.021$). The usefulness of online teaching was predicted only by the interaction gender (male) × origin (urban) ($p < 0.036$), while the usefulness of hybrid teaching was not correlated to any specific predictor.

## 4. Discussion

This study aimed to offer a perspective on medical students' perception of learning in the SARS-CoV-2 pandemic context in relation to coping strategies, stress, and social support. Additionally, we explored the gender differences of the quantitative variables taken into account in this study and the predictors of perceived usefulness of teaching (measured separately for classical, online, and hybrid teaching types). Throughout the study, the methodology paid special attention to the accuracy of the collected data, making the participants aware of the rationale of the study, the privacy and security policies, and the proper handling of the study instruments.

### *4.1. Perception of Learning*

#### 4.1.1. Communication

Regarding classical teaching, no predictor was identified as facilitating the communication with professors. However, this kind of system was appreciated as being satisfactory by the vast majority of students (66.66%). In contrast, online teaching was considered to rather inhibit this kind of communication, despite the fact that the number of semesters taught online seems to have an influence in modifying this perception for the better. Hybrid teaching has an intermediate position, with a positive role played by the ability to plan and male gender, possibly via a higher degree of assertiveness.

In what concerned peer communication, this was overwhelmingly considered superior in classical teaching, followed by hybrid teaching. Significant predictors of better peer communication were disinhibiting coping mechanisms (venting, self-distraction), while substance use did not facilitate it. In contrast, online teaching was nor preferred nor characterized by any specific predictor of peer communication.

As a whole, our data confirm previous Romanian reports about classical teaching being more advantageous for communication during the SARS-CoV-2 pandemic [66,67].

#### 4.1.2. Time Management

Online and hybrid types of teaching are by far considered more beneficial than classical teaching in terms of the efficient use of time, availability of extra time for hobbies, and other enjoyable activities and time planning. This can be explained by the higher flexibility of the online and hybrid forms of teaching compared to the classical one, a finding also reported by previous literature [68,69].

In terms of predictors, in classical teaching, time using was, as expected, positively predicted by active coping but also negatively predicted by substance use, use of humor, and planning. The latter two associations highlight the time-consuming characteristics of coping types that are normally considered healthy or desirable. Acceptance was associated with higher openness to spend time on hobbies, probably via the increase in their "legitimacy", once the stressful circumstances were considered "inherent".

In online teaching, time using was proportional to perceived stress, a finding which could be explained by the higher time needed to process and adjust to challenging life events once they get tensed. Time spent on hobbies was predicted in this type of teaching by coping strategies, characterized by interactivity (use of emotional support, instrumental support, and humor). As interactivity is also a fundamental characteristic of online teaching, one can hypothesize that the familiarity with this type of teaching can be attained earlier by the users of these strategies, thus allowing a subsequent relaxation and focus on hobbies. Additionally, men were more prone to spend time on hobbies, this being consistent with

their known propensity to stick less to a tight schedule [70]. In contrast, active coping had a negative impact on time spent on hobbies, probably via a lower level of relaxation.

In hybrid teaching, the strategies promoting the free use of time, such as positive reframing and self-distraction, had a negative impact on efficient time usage. Preclinical students were more focused on time usage, possibly because of the larger number of hours spent on academic duties in the preclinical curriculum. The number of semesters in this type of teaching positively influenced the time spent on hobbies, this likely being an effect of attaining a better academic adjustment.

#### 4.1.3. Cognitive Abilities (Learning/Understanding/Seeking Information/Focusing Attention)

In terms of cognition, classical teaching was reported to facilitate learning, understanding, and focusing of attention, while online and hybrid teaching were preferred for seeking information.

In classical teaching, multiple coping strategies (active coping use of instrumental support, religion, venting) were identified as predictors, this pointing out solid assimilation of a repertoire of attitudes and behaviors.

In contrast, in online teaching, the effects of certain coping mechanisms, such as social support, were much more nuanced, with a positive role of the emotional, social support, but with a negative impact on attention played by the instrumental social support. This could be explained by instrumental support being perceived by respondents as an element that could spare them from focusing on the course content and allowing fluctuant attention. Additionally, strategies such as self-distraction, substance use, and denial had expected negative predictive effects, but perceived stress had a paradoxical positive impact on focusing attention, possibly via a higher state of alert. Preclinical students reported a higher impact of this type of teaching, a fact that could be important to consider from the perspective of a higher implementation of online teaching in the future.

In hybrid teaching, cognitive abilities were predicted only by the number of semesters spent by students in this system. This rather intriguing finding could be explained by their low familiarity with this type of teaching, thus predisposing the students to a variety of coping strategies, not allowing too much awareness about their comparative effectiveness.

Overall, our data suggest an ambivalent student perception of online and hybrid types of teaching, in what cognitive abilities are concerned. These findings differ from international research in this area [71,72] which generally points out a much more positive student perception. The traditionally lower importance given to web-based information in the Romanian medical teaching system before SARS-CoV-2 pandemic may offer a partial explanation for this difference.

#### 4.1.4. Perception of Exams and Academic Achievement

In terms of the capability to reach good grades, the three types of teaching did not differ significantly, this being remarkable, considering that, for all the other survey questions, we isolated at least one significant difference. Oppositely, we identified a clear distinction between the online type of teaching and the other two in terms of perceived exam difficulty. The lack of direct contact with the professors and the technological risks adjacent to online examinations may have influenced this negative perception; this being also reported previously [73,74].

In terms of predictors, in classical teaching, the perception of exam difficulty was proportional to perceived stress and inversely proportional to the higher number of semesters. The latter finding can stem from the progressive students' adjustment to the academic demands.

In online teaching, adjustment was reflected in the higher ability of clinical students to reach better grades compared to preclinical ones. Exam difficulty was perceived as directly proportional to the perception of stress and the use of self-blame and inversely related to strategies focused on detachment (behavioral disengagement) and reconceptualization (positive reframing). Concerning planning, its apparent ineffectiveness in ensuring

better academic results could illustrate the lack of specific strategies oriented towards learning in the online format, reflecting the recent introduction of this type of teaching in Romanian universities.

Similarly to online teaching, in hybrid teaching, planning was ineffective in decreasing the perception of exams' difficulty, while positive reframing had the opposite effect, together with the use of emotional social support. The use of instrumental social support was associated with lower academic grades, probably via a false feeling of security brought by the help received from peers. Venting and, not surprisingly, perceived stress additionally increased the perception of exams as being difficult.

### 4.2. Gender Differences

Women obtained a higher score in behavioral disengagement. This fact can illustrate certain behavioral stereotypes characteristic to historically-rooted conservative norms met in the Romanian society [75]. Women also score higher on perceived social support (with the notable exception of the support received from the family, where their scores are similar to those of men). This finding could correspond to a real phenomenon, but at the same time, it may represent, especially in the context of self-reporting, an effect of greater attention paid to receiving support in a stressful professional context (university studies).

### 4.3. Comparative Usefulness of Classical, Online, and Hybrid Teaching

The classical type of teaching is seen as the most useful, followed by hybrid and online teaching. This finding completes recent Romanian studies dedicated to the study of web-based teaching [76,77] and points out the necessity of further efforts for improving its acceptance.

In terms of predictors, denial and the use of instrumental support correlated negatively to the perception of usefulness in classical teaching. This may have had different reasons (for denial, a certain lack of adjustment in the academic context, and for instrumental support, the underestimation of the benefits of education, as long as its challenges could be eased by the help received from others). Students stemming from rural areas appreciated classical teaching as useful, this being consistent with the traditional positive value attributed to learning in this context [78]. In contrast, the usefulness of online teaching was appreciated mostly by the male urban population, a category that is among the most frequent users of web-based resources. Hybrid teaching was not predicted by any specific variable, reflecting the novelty of this kind of instrument, at least for the Romanian academic context.

### 4.4. Limitations

This study has a number of limitations. The sample size was rather small, and the participation in the survey was based on self-selection. A recall bias can have been present (as the participants had more recent contact with online and hybrid teaching types in the context of the SARS-CoV-2 pandemic). The online answering format could have also further biased the answers concerning online teaching. The sample was asymmetric in terms of gender and origin, although this reflects the real proportion of students in medical universities (skewed towards women from urban areas). The design of the study was cross-sectional, not allowing the assessment of the study variables in their short- and long-term dynamics. The level of digital competence and the easiness of online communication have not been considered preconditions for the inclusion of participants in the study.

### 4.5. Future Research

Next, studies on this theme could be run longitudinally and include other potentially relevant variables (e.g., pertaining to personality). Moreover, a distinct line of development could be represented by the creative use of the qualitative methodology. The comparative evaluation of classical, online, and hybrid teaching, using, for example, focus groups, could

not only supplement the data, but also offer a valuable opportunity for students to reflect on various types of teaching, and assess them in relation to their needs and expectations.

## 5. Conclusions

This study points out a series of important findings regarding the perception of learning in Romanian medical universities during the SARS-CoV-2 pandemic.

Across the study sample, the classical type of teaching remains preferred, as it is seen as more advantageous in terms of communication, easiness of learning, understanding, focusing attention, and exam difficulty. However, online and hybrid types of teaching were preferred in terms of time management and information seeking. Future improvements in these two types of teaching could progressively offer an increasing number of advantages and eventually make them competitive enough to be implemented on a larger scale. In this sense, an asset could be represented by the fact that all teaching types were considered by the study respondents to offer similar chances for attaining good grades.

In terms of coping strategies, they were diverse across the study sample, with preference given to active coping, humor, acceptance, and religion. Dysfunctional strategies, such as denial and substance use were much less preferred; however, when present, they had a predictive negative impact on communication with peers, time using, and learning abilities.

Concerning stress, it was associated in all types of teaching with the perception of exams as being more difficult but also had a stimulating effect in online teaching, through the increase in focusing of attention and in allowing a more flexible time using.

Similarly, social support had an ambivalent effect, with direct benefits brought to learning and to time management, but with a rather demobilizing effect of instrumental social support in online and hybrid teaching.

Gender differences were scarce and related mostly to behavioral disengagement and social support, both higher in women.

The usefulness of teaching remains the highest for the classical format. The hybrid and the online teaching follow, with online teaching perceived as most useful by male urban participants, and hybrid teaching not associated with any specific predictor.

As a whole, these findings may contribute to the identification of directions for the strategic growth and refinement of web-based teaching methods in medical universities in the wake of the SARS-CoV-2 pandemic. By taking into account the learning perceptions of medical students, this kind of evolution has higher chances of being sustainable and positively influence in the long term their motivation, involvement, and academic performance.

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