**Education Journal**
2022; 11(3): 101-111
http://www.sciencepublishinggroup.com/j/edu
doi: 10.11648/j.edu.20221103.13
ISSN: 2327-2600 (Print); ISSN: 2327-2619 (Online)

# Social Accountability of Medical Schools Toward Their Students

**Maria Teresa Alfonso Roca[1], Monica Muñoz Lopez[2], Luis Filgueira[1, *]**

[1]Section of Medicine, Faculty of Science and Medicine, University of Fribourg, Fribourg, Switzerland

[2]Department of Medical Sciences, Faculty of Medicine of Albacete, University of Castilla la Mancha, Albacete, Spain

## Email address:

mariateresa.alfonsoroca@unifr.ch (M. T. A. Roca), Monica.MunozLopez@uclm.es (M. M. Lopez), luis.filgueira@unifr.ch (L. Filgueira)

[*]Corresponding author

## To cite this article:

Maria Teresa Alfonso Roca, Monica Muñoz Lopez, Luis Filgueira. Social Accountability of Medical Schools Toward Their Students. *Education Journal*. Vol. 11, No. 3, 2022, pp. 101-111. doi: 10.11648/j.edu.20221103.13

**Received**: January 14, 2022; **Accepted**: April 14, 2022; **Published**: May 19, 2022

**Abstract:** Social accountability refers to the role of institutions, including medical schools, as contributors to an evolving society. The COVID-19 pandemic and global health crisis have exacerbated challenges and difficulties of medical schools to adopt the social accountability paradigm. This exploratory study aims to identify weaknesses and demands of medical students during the COVID-19 pandemic with the intention of developing interventional, socially accountable educational programs. An online questionnaire was sent to medical students in year one to three for collecting data about students' perception of preparedness to cope with sudden changes from in-person to online teaching due to COVID-19 measures. In addition, data about students' well-being was collected according to the Shirom-Melamed Burnout Measure and the Connor-Davidson Resilience Scale. 221 of 376 students completed the questionnaire (58.7%). During the COVID-19 pandemic, most medical students kept up with new educational technologies and adjusted to online learning. However, most students suffered from poor time and learning management, poor quality of life and burnout. Data analysis on wellbeing variables showed: a) poor quality of life (52%); b) medium to high level of burnout (65.1%), with the highest number of students with burnout (70%) in third year; c) medium level (73.8%) to high level (23%) of resilience across all years. Our study indicates that medical schools need to be socially accountable towards their students and allocate additional resources into programs for the support of the cognitive and emotional needs of medical students, with the emphasis of improving students' learning management and cognitive skills, and by doing so, reducing burnout and improving quality of life. Finally, social accountability should also include students' wellbeing, in addition to activities related to patients, health system and society.

**Keywords:** Burnout, Cognitive Load, COVID-19 Pandemic, Medical Schools, Medical Students, Quality of Life, Resilience, Social Accountability

## 1. Introduction

### *1.1. Social Accountability and Student Wellbeing*

Social accountability by medical schools is defined as "an obligation to direct education, research and service activities toward addressing the priority health concerns of the community, region, and/or nation; they have a mandate to serve » [1]. This includes various institutions and companies and should be inclusive of all the different dimensions of society, such as patients, minorities, small and large communities [2-6].

It is crucial to include the framework of social accountability during the first training years of a medical doctor and to lay the foundations for a future professional, enabling them to master the changing needs of society and applying new technologies, as well as novel paradigms that forecast, among other things, the entry of the era of transhumanism. Whatever type of medical practice will exist in the future, health professionals will have to adapt to changes in an evolving society. Therefore, ten strategies were defined within the framework of social accountability of medical schools, which are related to future new functions of doctors and health professional [7]. However, teaching adaptability and social accountability to health professionals, fundamentally rooted in the perception of the social context,

self-perception and the sense of self-efficacy to manage stress in complex situations, ought already to start at the level of a medical student.

Learning to cope with a rapidly changing world can be challenging for medical students. COVID-19 has immersed affected students into rapid adaptation, without prediction and preparation for it [8]. The students needed to adapt instantly to new learning conditions by putting additional demands and substantial stress on them. Under those circumstances, medical schools need to be aware of their social accountability toward their students, including toward providing additional support for learning and for a sustainable quality of life, as well as for preventing burnout [9].

In 1995, the WHO [10] published the concept of quality of life as 'The perception that an individual has of his place in existence, in the context of the culture and value system in which he lives and in relation to his objectives, expectations, norms and concerns'. It is a concept that is influenced by the physical health of the subject, their psychological state, their level of independence, their social relationships, as well as their relationship with their environment. Low quality of life may lead to burnout. Burnout is a term used to express the fact of being consumed. It is represented by a feeling of professional exhaustion, a decrease in personal fulfilment, and a tendency toward dehumanization [11]. Professional burnout in medical students represents an inadequate response to stressful learning and living conditions that leads to a decrease in well-being, quality of life and professional capability [12]. However, both, poor quality of life and burnout are factors that can potentiate personal development if well managed.

In general, medical training programs lack modules or subjects intended for the personal development of the students, to potentiate their study management and resiliency in the face of complex situations or to use effective tools in the face of professional exhaustion or burnout. Usually, it is assumed that students, who choose these health professions, are better equipped to deal with these situations than other students. Unfortunately, the scientific literature on this point indicates the opposite. Medical students tend to have higher rates of problems in mental and physical quality of life, including depression, anxiety, and fatigue [13-15]. In relation to health professionals, the literature also indicates that the prevalence of presenting symptoms of professional burnout is almost two times higher than that of other workers [16, 17]. However, resiliency is also higher in health professionals than in that of the general population [18]. This offers a window of opportunity to medical schools for potentially improving personal development of students, and therefore, alleviating the extra cognitive load, especially that occurring during a health crisis like COVID-19.

### *1.2. Challenges During COVID-19*

The global health crisis caused by the COVID-19 pandemic and its subsequent social and political response has highlighted the urgent need to apply the principles of social accountability within medical schools. These principles, which were the subject of a global consensus in 2010 are part of the accreditation of medical programs in many medical training programs worldwide [19]. These principles lead us to rethink the mission of medical schools in society and how to contribute to its development [20]. We speak of a state of awareness of the duties of medical schools in the face of the changing needs of society [21].

The current COVID-19 pandemic, that we are experiencing, is showing us the extent to which medical schools, including Fribourg University, were yet unprepared to face corresponding challenges and to assume the paradigm of social accountability [22].

The medical schools have been overwhelmed by the change from a face-to-face learning system to online teaching, adaptations in research programs, orienting them towards knowledge of the virus and its implications on the physical, mental, social, and economic health of individuals and society [23].

Various published articles about the COVID-19, related health crisis in the field of medical education, report that at first, the faculties were closed due to the confinement imposed and online teaching was adopted [8, 24, 25]. However, few months later, the educational centres returned to open their doors by introducing a multitude of sanitary measures to minimize the spread of the virus. Each country and each medical school carried out different adaptive responses to these challenges. All these measures were extremely beneficial for fighting the pandemic. However, the medical students were not exempt from secondary risks and vulnerabilities [26], including social isolation, burnout, and mental health problems.

Especially, students in their clinical training have suffered the most from the impact of the pandemic. In some cases, medical students were sent to perform functions usually aimed for resident doctors or seniors. In other cases, the students were assigned to perform auxiliary tasks of other health professionals in which they gained new learning experiences, but in many cases, the tasks were repetitive and the experiences of little value. In other cases, the students were simply excluded from the clinical environment, alleging reasons related to the risk of infection, although the unspoken cause was that they were a nuisance in overflowing hospitals with a lack of trained health professionals [22, 27-31].

### *1.3. University of Fribourg as Example*

Medical education at the University of Fribourg is a special case because since 2009 it has offered a Bachelor of Medicine over three years for a cohort of about 120 students per year. This is a basic preclinical traditional study programme that prepares the student for their Master degree and then toward clinical training. Most students graduating with a Bachelor degree in Fribourg continue their Master degree at the University of Basel, Bern and Zurich. In Fribourg, the Master of Medicine programme was implemented only in 2018 for a cohort of 40 students per year with an orientation toward family medicine. However,

the medical school also implemented the principle of social accountability through its new rules and regulations, established with the new Master degree [32]. Interestingly, in 2017, only about twenty of the 2440 medical schools worldwide have received an explicit mandate from the corresponding governing agency for including social accountability in their program [33, 34].

On March 16, 2020, a bunch of students in the Bachelor programme volunteered to help in the health system when the pandemic fully affected Switzerland, when the University of Fribourg was closed and teaching remained purely online for the remaining of the spring semester. However, most of these students were not accepted into the clinical environment, at that time completely overwhelmed by the number of patients suffering from severe COVID-19. The students' concerns arriving by e-mail to those responsible for the Bachelor programme reflected the situation of fear and anguish, they were experiencing anyway because of the special pandemic situation. They were afraid of losing the school year, of how the examinations would be, whether the clinical practicals that had not been carried out would be recovered, as well as that family members or friends would succumb to the disease, etc.

This study focuses precisely on these students of the first cycle of medical training (Bachelor) heavily affected by the pandemic in the first instance. The following questions were addressed: How did students of the Bachelor of Medicine perceive their training during this period of pandemic? What were the main difficulties in relation to their personal experiences and training? By reinforcing the medical teaching institution's social accountability in the face of new future health crisis situations, what measures did the teaching institution implement that can improve the Bachelor program in medicine in the future? To start addressing some of these issues, we aimed to identify the status of wellbeing and cognitive vulnerabilities in Bachelor of Medicine students during the pandemic period.

### *1.4. Objectives of Study*

The purpose of this study was firstly to identify the main wellbeing, cognitive needs, and vulnerabilities of Bachelor of Medicine students during this unprecedented health crisis of COVID-19. Secondly, with the study outcome in mind, the subsequent aim would be to provide better support to the students and to adapt the training program to this new reality and to contribute to the mandate of social accountability of the University of Fribourg for the Bachelor of Medicine students.

Therefore, the final goal of this work is to establish a program for improving personal development of medical students in terms of wellbeing and learning efficiency, with a special interest on equipping them with the skills for mastering future health crisis situations. To do this, we first aimed to determine: a) emotional vulnerabilities by studying quality of life, burnout and resiliency and b) cognitive weakness by looking at the degree of satisfaction and skills with online learning.

## 2. Methods

### *2.1. Study Design and Participants*

The study was designed as a descriptive cross-sectional study, unicentre and prospective. Participants were all the students enrolled in the Bachelor of Medicine at the University of Freiburg, including years one to three (N=376, see demographics in Table 1). All students were invited to participate anonymously and voluntarily in the study. The online survey was compiled and sent via SurveyMonkey in the second semester of the 2020/21 academic year, April and May 2021, before the final exams were held.

### *2.2. Ethics*

This study was conducted according to the Declaration of Helsinki for research with human data (1964), the more recent General Data Protection Regulation (EU- 2016/679), as well as www.swissethics.ch. The questionnaire was administered anonymously as part of the internal medical quality of education check at the University, and therefore, no local ethics approval was required.

### *2.3. Questionnaire*

The questionnaire included three sections. A first part refers to demographic data (age, sex, year of study and mother tongue, computer skills and previous participation in online courses) a second explores several key elements of online or virtual teaching (motivation, pedagogical coherence, teaching methodology, evaluation, participation, teacher-student relationship, workload, acceptance of distance education and level of learning). In the third part of the questionnaire, students gave their opinion about their life experience during the pandemic, about their quality of life, their exhaustion (burnout) and about their degree of resilience.

To measure the perception of quality of life: a single-item linear analogue scale has been used. Students assessed their overall perception on a 10-point scale, with response options ranging from "as bad as it can be" (grade 0) to "as good as it can be" (grade 10). A score of 5 or less than 5 indicates a perception of quality of life associated with an unhealthy lifestyle, mental health problems and academic failure, as well as a negative impact on professional development.

To measure students' burnout, the adapted French translation of the Shirom-Melamed Burnout Measure scale [35] has been used, which consists of 14 items, evaluated on a Likert-type frequency scale graduated from 1 (never) to 7 (always), grouping the main symptoms of exhaustion. The scale is subdivided into three dimensions: physical fatigue (six items), emotional exhaustion (three items) and cognitive fatigue (five items). The total score ranges from 0 to 98; a higher score indicates a higher probability of burnout. The ranges are: high (74-98), medium (50-73), low (25-49) and very low (0-24).

Finally, to measure the degree of resilience, we have used the adapted French version of the abbreviated form of the Connor and Davidson resilience scale validated by Guihard G, et al (2018) [36]. This version meets several criteria that

indicate acceptable psychometric qualities.

These three questionnaires have been administered through an anonymous online survey with the help of *SurveyMonkey* (SurveyMonkey Inc., San Mateo, CA, USA, www.surveymonkey.com).

The students have been invited to fill in the questionnaire by means of a brief introduction on the objectives of the study. The questionnaire did not require instructions.

### *2.4. Statistics*

Data were stored and analysed using Excel and SPSS (v.24) statistical analysis package. Descriptive analysis of the data was carried out based on frequencies and means with the corresponding measures of dispersion, i.e. standard deviation. Means were used instead of median and interquartile range as the sample size was sufficiently large to allow it. Rank, non-parametric Spearman correlations were calculated for quality of life, burnout, and resilience. Statistical values were taken as significant if $p<0.05$. Chi square tests were used to determine differences between year 1, 2 and 3 for those variables expressed in frequencies, although, they failed to show any differences and, therefore, have not been reported here.

## 3. Results

The most relevant results are described in the following paragraphs, but the details can be found in the tables. A total of 221 (58.7%) Bachelor of Medicine students completed the survey (65.6% women). Participation was greater in year 3 (72.7%) than in years 1 (45.4%) and 2 (60.09%). Regarding the students´ first language, French was the leading one in year 1 (43%), whereas in years 2 and 3 is mostly German-language (47.06% and 60.23%, respectively) (for details, see Table 1).

***Table 1.*** *Student sample demographics.*

| | *Year 1* | *Year 2* | *Year 3* | *Total* |
|---|---|---|---|---|
| Questionnaire | | | | |
| Sent | 143 | 112 | 121 | 376 |
| Responded | 65 | 68 | 88 | 221 |
| Response rate (%) | 45.45 | 60.09 | 72.70 | 58.70 |
| Gender | | | | |
| Female n (%) | 46 (70.70) | 41 (60.20) | 58 (65.91) | 145 (65.60) |
| Male n (%) | 19 (29.20) | 27 (39.71) | 30 (34.09) | 76 (34.30) |
| Age (Mean ± Std) | 20.54± 1.4 | 21.32± 1.12 | 23.07±2.03 | |
| First language n (%) | | | | |
| Deutsch | 26 (40) | 32 (47.06) | 53 (60.23) | 111 (50.2) |
| French | 28 (43) | 17 (25) | 21 (23.86) | 66 (29.8) |
| Italian | 6 (9.2) | 17 (25) | 13 (14.77) | 36 (16.2) |
| Other | 5 (7.6) | 2 (2.94) | 1 (1.14) | 8 (3.6) |

### *3.1. Perception of Online Learning*

The great majority of students (76.9%) had a basic knowledge of computer programs (Word, Excel, PowerPoint). However, we observed a trend towards more computer management skills in the younger cohort (year 1 students) compared with year 2 and 3; 29.2% stated to have medium or higher skills in year 1 compared to 13.3% in year 2 and 25% in year 3. Similarly, 43% of first year students have already had previous experiences of *online* teaching compared to 14% in second year and 22.73% in year 3. Computer applications used by the students varied, with Moodle and YouTube platforms being the most popular (see Table 2). All students stated to have the necessary computer material resources to carry out online teaching with 95.02% having a laptop (for more details see Table 2).

### *3.2. Quality of Online Learning and Student' Difficulties*

Students' online learning workload felt heavier compared with in person learning (mean: 3.02 ± Standard deviation 0.92, scale 0-4, 0=not heavier, 4 extremely heavier). The students perceived a strong deficit for the information received about what was expected from them during the pandemic, both from the academic leaders (2.44 ± 0.89), as well as from the teaching staff assigned to the different subjects (2.66 ± 0.81). First and second year students reported that the information received from the teachers was slightly higher in comparison to third year students.

After the specific material was made available to the students, books were the most popular resource to study, especially in the first year (50%).

Students considered that online learning was effective for the acquisition of knowledge (2.99 ± 0.77) on a scale of 1-4 (1 being ineffective and 4 being very effective) and slightly lower for the learning of skills (2.78 ± 0.77, same scale).

On the other hand, they did not indicate having great difficulties in following the online courses in relation to technical problems derived from this type of teaching. The main problems detected indicate that the greatest difficulties in this type of learning derived from a lack of competence in time management and the use of effective study methods. Almost 20% of all students indicated this problem, with almost 30% in the first year. Isolation was another main difficulty identified by students.

Students' online learning workload felt heavier compared with in person learning (mean: 3.02 ± Standard deviation 0.92, scale 0-4, 0=not heavier, 4 extremely heavier). The students perceived a strong deficit for the information received about

what was expected from them during the pandemic, both from the academic leaders (2.44 ± 0.89), as well as from the teaching staff assigned to the different subjects (2.66 ± 0.81). First and second year students reported that the information received from the teachers was slightly higher in comparison to third year students.

***Table 2.*** *New technology, computer resources and skills related with e-learning.*

| | Year 1 | Year 2 | Year 3 | Total |
|---|---|---|---|---|
| Computer skills n (%) | | | | |
| Basic | 46 (70.70) | 58 (85.29) | 66 (75) | 170 (76.9) |
| Middle | 16 (24.6) | 7 (10.29) | 21 (23.86) | 44 (19.9) |
| High | 3 (4.6) | 3 (4.41) | 1 (1.14) | 7 (3.1) |
| E-learning previous experience n (%) | | | | |
| Yes | 28 (43) | 10 (14.71) | 20 (22.73) | 58 (26.2) |
| No | 37 (56.9) | 58 (85.29) | 68 (77.27) | 163 (73.75 |
| E-applications n (%) | | | | |
| YouTube | 12 (18.40) | 19 (28.36) | 25 (29.41) | 56 (25.30) |
| Moodle | 22 (33.80) | 18 (26.87) | 24 (28.24) | 64 (28.90) |
| MS Teams | 8 (12.30) | 3 (4.48) | 6 (7.06) | 17 (7.60) |
| Switch Tube | 10 (15.38) | 13 (19.40) | 12 (14.12) | 35 (15.80) |
| Facebook | 0 | 3 (4.48) | 2 (2.35) | 5 (2.260) |
| Other | 13 (20) | 11 (16.42) | 16 (18.82) | 40 (18.09) |
| Computer device / type n (%) | | | | |
| PC Desktop | 15 (23.00) | 11 (16.18) | 17 (19.54) | 43 (19.45) |
| PC Laptop | 61 (93.80) | 62 (91.18) | 87 (100) | 210 (95.02) |
| Internet | 56 (86.10) | 59 (86.76) | 80 (91.95) | 195 (88.20) |
| Printer | 38 (58.4) | 34 (50) | 44 (50.57) | 116 (52.40) |
| Webcam | 32 (49.2) | 34 (50) | 45 (51.72) | 111 (50.20) |
| Smart phone | 62 (95.38) | 61 (89.71) | 80 (91.95) | 203 (91.85) |
| Other | 5 (7.60) | 10 (14.71) | 5 (5.75) | 20 (9.04) |

After the specific material was made available to the students, books were the most popular resource to study, especially in the first year (50%).

Students considered that online learning was effective for the acquisition of knowledge (2.99 ± 0.77) on a scale of 1-4 (1 being ineffective and 4 being very effective) and slightly lower for the learning of skills (2.78 ± 0.77, same scale).

On the other hand, they did not indicate having great difficulties in following the online courses in relation to technical problems derived from this type of teaching. The main problems detected indicate that the greatest difficulties in this type of learning derived from a lack of competence in time management and the use of effective study methods. Almost 20% of all students indicated this problem, with almost 30% in the first year. Isolation was another main difficulty identified by students.

Regarding the degree of satisfaction with the type of education received during this period of pandemic and the achievement of learning objectives, 33.03% of the students considered the measures adopted by the institution insufficient to achieve those objectives set in the training. This percentage was slightly higher in third year (35.64%). However, a high proportion of students considered that the quality of training during the 2020/21 academic year has been good or excellent (43.89%). 61.24% of students preferred the evaluation methods proposed at the beginning of the course, that is, in-person with all the guarantees of compliance with health regulations, followed by online evaluation, although this entails less supervision by teachers and the possibility for students to cheat on exams (15.38%).

Finally, 66.52% of the students reported that during the period of pandemic, their relationships with colleagues, professors and university personnel were more difficult (Table 3).

### *3.3. Quality of Life*

The students assessed their overall perception of quality of life on a 10-point scale, in which a score of 5 or less than 5 indicates perception of quality of life associated with unhealthy lifestyle, mental health problems and academic failure, as well as a negative impact on professional development. The results show that 54.75% of the students perceived quality of life not exceeding 5 points out of 10, reaching 67.05% in the third year of the Bachelor's degree.

In order to compare the quality of life data with that of resilience and burnout, scoring subscales were established at 0-100, with ranges: 0-25 Very Low, 26-50 Low, 51-75 Medium, 76-100 High. Quality of life was perceived as medium or high by 50% of the students in year 1, 43.76% in year 2, and 32% in year 3 (Table 4). Quality of life correlated positively with resilience ($r= 0.34$, $p< 0.000$).

### *3.4. Burnout*

Most of the students (65.1%) presented a medium to high degree of exhaustion, with worst outcome in year 3 (69.32%). The score progressively increased from first to third year, with a difference of 1.7 points between first and second and 6.08 points from second to third year (Table 5). Burnout correlated negatively with quality of life ($r= - 0.47$, $p< 0.000$) and resilience ($r= -0.45$, $p<0.000$).

***Table 3.*** *Benefits and challenges of online learning.*

| **E-learning** | **Year 1** | **Year 2** | **Year 3** | **Total** |
|---|---|---|---|---|
| Workload compared with *in person* learning (mean ± Std, scale: 0-4) | 3.05± 1.03 | 2.99± 0.87 | 3.02± 0.86 | 3.02± 0.92 |
| *Clarity on information about expectations on your e-learning* | | | | |
| Academic program representatives | 2.32± 0.90 | 2.54± 0.89 | 2.44± 0.87 | 2.44± 0.89 |
| Discipline representatives | 2.78± 0.74 | 2.73± 0.84 | 2.58± 0.81 | 2.66± 0.81 |
| *Preferred resources n (%)* | | | | |
| Books | 32 (50) | 17 (25) | 26 (29.55) | 75 (33.93) |
| Web Sites other than the university's | 6 (9.68) | 7 (10.29) | 9 (10.23) | 22 (9.95) |
| Youtube/ videos | 11 (17.74) | 16 (23.53) | 9 (10.23) | 36 (16.20) |
| Scientific articles | 0 | 1 (1.47) | 1 (1.14) | 2 (0.90) |
| Student notes from higher courses | 7 (8.06) | 19 (27.94) | 27 (30.68) | 53 (23.98) |
| Other | 7 (11.29) | 7 (10.29) | 14 (15.91) | 28 (12.60) |
| None | 2 (3.23) | 1 (1.47) | 2 (2.27) | 5 (2.26) |
| *E-learning efficacy to acquire:* (scale: 0-4, mean± Std) | | | | |
| Knowledge | 2.80± 0.82 | 3.16± 0.75 | 3± 0.71 | 2.99± 0.77 |
| Competencies and skills | 2.58± 0.86 | 2.93± 0.75 | 2.81± 0.70 | 2.78± 0.77 |
| *Difficulties with n (%):* | | | | |
| Platforms, tools (Zoom, Moodle) | 4 (6.15) | 3 (4.41) | 4 (4.55) | 11 (4.98) |
| Lack of computer/IT tools (webcam, microphone) | 0 | 1 (1.43) | 0 | 1 (0.45) |
| Internet connection (access, log in, WIFI) | 3 (4.62) | 3 (4.41) | 1 (1.14) | 7 (3.17) |
| Time (dependents at home, job) | 4 (6.15) | 9 (13.24) | 14 (15.91) | 27 (12.22) |
| Psychosocial difficulties (financial, family) | 5 (7.69) | 4 (5.88) | 5 (5.68) | 14 (6.33) |
| Lack of working space (no adequate space for work, unavoidable noise) | 4 (6.15) | 2 (2.94) | 10 (11.36) | 16 (7.24) |
| Lack of organization and/or studying methods | 19 (29.23) | 12 (17.65) | 13 (14.77) | 44 (19.91) |
| Feeling of isolation | 12 (18.46) | 14 (20.59) | 17 (19.32) | 43 (19.45) |
| No difficulties | 10 (15.38) | 13 (19.12) | 12 (13.64) | 35 (15.84) |
| Other | 4 (6.15) | 7 (10.29) | 12 (13.64) | 23 (10.40) |
| *Did the university take enough contingency measures to allow you reach the learning objectives? n (%)* | | | | |
| Yes | 15 (23.44) | 23 (33.82) | 23 (26.44) | 61 (27.60) |
| No | 22 (34.38) | 20 (29.41) | 31 (35.64) | 73 (33.03) |
| *Quality of e-learning in 2021 n (%)* | | | | |
| Good/ excellent quality | 27 (41.19) | 39 (56.95) | 31 (35.63) | 97 (43.89) |
| Bad/ very bad | 6 (9.38) | 6 (8.82) | 12 (13.79) | 24 (10.86) |
| *Assessment methods adequacy n (%):* | | | | |
| In person with sanitary caution | 35 (53.85) | 41 (60.29) | 58 (65.91) | 134 (61.24) |
| Online without supervision | 8 (12.3) | 12 (17.65) | 14 (15.91) | 34 (15.38) |
| *COVID crisis and keeping relationships with academics, university services and peers n (%)* | | | | |
| Same or easier | 7 (11.29) | 10 (14.70) | 8 (9.09) | 25 (11.31) |
| More difficult | 30 (48.39) | 50 (73.53) | 67 (76.14) | 147 (66.52) |

***Table 4.*** *Quality of life.*

| | **Year 1** | **Year 2** | **Year 3** | **Total** |
|---|---|---|---|---|
| Perceived quality of life (scale 0-10) mean ± Std | 5.23± 1.91 | 5.43± 2.05 | 4.95±1.83 | 5.19± 1.92 |
| Score 6 or over n (%) | 36 (56.25) | 34 (50) | 29 (32.95) | 99 (44.80) |
| Score 5 or lower | 28 (43.75) | 34 (50) | 59 (67.05) | 121 (54.75) |
| High (76-100) n (%) | 10 (15.63) | 12 (17.65) | 8 (9.09) | 30 (13.50) |
| Medium (51-75) | 18 (28.13) | 22 (32.35) | 21 (23.86) | 61 (27.60) |
| Low (26-50) | 29 (45.31) | 30 (44.12) | 56 (63.64) | 115 (52) |
| Very low (0-25) | 7 (10.94) | 4 (5.88) | 3 (3.41) | 14 (6.30) |

***Table 5.*** *Burnout.*

| **Burned-out (scale 0-98)** | **Year 1** | **Year 2** | **Year 3** | **Total** |
|---|---|---|---|---|
| High (74-98) | 11 (16.92) | 14 (20.59) | 12 (13.64) | 37 (16.70) |
| Medium (50-73) | 29 (44.62) | 29 (42.65) | 49 (55.68) | 107 (48.40) |
| Low (25-49) | 21 (32.31) | 23 (33.82) | 25 (28.41) | 69 (31.20) |
| Very low (0-24) | 4 (6.15) | 2 (2.94) | 2 (2.27) | 8 (3.60) |

***Table 6.*** *Resilience.*

| **Resilience, scale: 0-70, n (%)** | **Year 1** | **Year 2** | **Year 3** | **Total** |
|---|---|---|---|---|
| High (53 – 70) | 15 (23.08) | 18 (26.40) | 18 (20.45) | 51 (23.08) |
| Medium (36 – 52) | 43 (66.15) | 50 (73.55) | 70 (79.55) | 163 (73.76) |
| Low (18 – 35) | 7 (10.77) | 0 | 0 | 7 (3.17) |
| Very low (0 – 17) | 0 | 0 | 0 | |

### *3.5. Resilience*

The results indicate that 73.76% of the students presented a medium level of resilience and 23.08% high level. A low level of resilience is only observed in 10.77% of first-year students (Table 6).

## 4. Discussion

Social accountability has become increasingly important for medical schools and their educational activities, primarily toward patients, their relatives and society as a whole. However, during the COVID-19 health crises it has become evident that social accountability is also required toward their students. With that in mind, this study collected basic data about medical students' coping with the present challenges of confinement, online learning, social distancing and an uncertain future due to COVID-19 measures. Thereby, the focus was on assessing students' quality of life, level of burnout and resilience.

The main results from this study are as follows. Firstly, years 1 to 3 Bachelor students of Medicine at the University of Fribourg had sufficient access and could keep up with new technologies and resources. However, the students´ learning management skills may be improved, as well as corresponding supportive teaching skills of the university staff. Secondly, students' quality of life was poor with clear signs of burnout, even though they reported medium to high levels of resilience. The results also indicate that 52% of the students present a low level of quality of life and 65.1% a medium to high level of burnout. These results are consistent with other studies cited in the literature [37, 38] that show that medical students have a lower quality of life than other students or the general population, but a higher level of resilience [18].

Although we do not have pre-pandemic data regarding the items analysed in this study, a study carried out in 2010 [39] indicates that 11% of medical students think about dropping out each year. Burnout and poor quality of life seem to be related to a higher likelihood of these thoughts. Our present results, although enhanced by the COVID-19 situation, support those findings.

The following two aspects of the results are discussed in the following paragraphs within the context of developing interventional programs to address to the students' needs: 1) wellbeing in terms of quality of life, burnout and resilience and 2) cognitive aspects in terms of learning strategies.

### *4.1. Online Learning/Teaching and Technology*

Students´ preparedness was high for a change from in-person to online learning at the level of educational technologies, both at the level of computer knowledge/skills and materials. Our study appreciates this trend in high skills, especially in year one students. This indicates that the students are well prepared for this part in secondary school, and probably not much more support is required at tertiary level.

In terms of quality of online learning, although 43.89% of those surveyed claim to have received a good or excellent quality of training, only 27.6% say that the training received, allowed them to achieve the objectives of the course. On the other hand, 66.52% reported many difficulties in maintaining ties with teaching staff and classmates, as well as significant deficits in communication with teachers and program managers, especially to learn about what was expected of them in this period. This inconsistency in the results (good or excellent perception of the quality of the program versus low perception of achieving the objectives of the course) suggests, not only that the communication and interpersonal relationship systems must be substantially improved and adapted to the needs of students, but also reflects the students' fear of not being prepared to pass exams and suffer gaps in their training. The possibility of deficient educational success worries not only students, but also the government of many countries due to the consequences of the COVID-19 crisis [40].

In summary, online teaching/learning is highly appreciated by the students and is here to stay and students appreciate the benefits that this technology offers [40]. However, students rather prefer in-person teaching, especially in experimental or practical disciplines [41, 42]. According to some experts, there are many reasons to believe that hybrid and distant learning devices will be widely used in training centres after this pandemic, but they may be rather used as additional and supporting methods.

### *4.2. Learning Management and Efficacy Skills: Cognitive Load*

Cognitive load refers to the total amount of mental activity performed by memory at any given time. There are three types of cognitive load: 1) *intrinsic cognitive load,* resulting from the amount of new content that we need to know and did not know before, which is higher in novices than in experts; 2) *relevant cognitive load* is the one that occurs as a consequence of processing the information to make sense of it, which implies the need to activate previous knowledge and establish connections; 3) the *extrinsic or alien cognitive load* is what generates any information or thought that interferes with working memory and is superfluous for what we are learning (environmental noises, music, thoughts not related to the task, a pandemic or health crisis). These three types of cognitive load can occur at the same time and their effects are additive [43-45].

The difficulties reported by students in this study represented mainly two aspects. The first aspect is the difficulty of managing learning (lack of effective methods, lack of time management) and the second aspect is working in isolation. Under such conditions, students may experience increased cognitive load. The corresponding literature suggests that an increase in cognitive load is one of the main problems of medical students, especially in first year [46]. In our study, an

increase in intrinsic cognitive load was confirmed with a general mean of 3.02 ± 0.92 (on a scale of 4), also observing a trend of greater load in the first year (3.05 ± 1.03). One of the factors related to the relevant cognitive load is applying efficient study methods and optimal time management for effective learning. In this study's sample, 20% of students reported difficulties in terms of study methods and time management, with about 30% affecting the first-year students. Regarding external loads, during the COVID-19 measures, the feeling of isolation, reported by almost 20% of the students, has also to be considered as one additional factor that increased the general cognitive load.

### *4.3. Quality of Life, Burnout and Resilience*

Several published studies [13-16] show that medical students are considered a population at high risk of poor quality of life. It has been proven that medical students present higher levels of psychological distress compared to the general population and other students [16, 17]. Medical studies carry great stress due to high competitiveness, lack of free time and psychological anguish, related to the treatment and suffering of the patient. Depression is also common among students, although it is usually hidden, since they consider mental illness as a form of weakness. All these factors contribute to decrease in quality of life of medical students.

Previously to the pandemic, medical studies by themselves were the main cause of burnout in medical students, and prevalence can vary between 15% and 45% [47, 48]. In this study, two thirds (65%) of the students reported medium or high levels of burnout, these higher values possibly due to the pandemic. There are more than 32 definitions of the concept of resilience that have been developed since the 70s of the last century [49]. However, resilience is a dynamic process of an individual or group to maintain their quality of life, to project themselves into the future despite destabilizing obstacles of life, and even to be able to transform themselves. That is, the human capacity to overcome adverse situations favourably.

The level of resilience, as measured in this study is medium in 73.76% of the students and high in 23%. These data coincide with those of other studies that show a high and medium level of resilience in medical students. There is also evidence indicating that physicians have a higher level of resilience than the general population. However, some articles suggest the need to prepare students to understand that the practice of medicine is emotionally and intellectually demanding, incorporating programs of resilience throughout their training [50-52].

The results showed that 58% of the students report poor quality of life, but high resilience (96% medium-high resilience). In addition, a better quality of life correlates positively with resilience, but negatively with burnout. This means that those who had better quality of life had even better resilience. These results are in agreement with previous reports on medical students rating worst in quality of life compared with students from other degrees [53, 54] and higher resilience than the general population [18, 55]. The students from the first cycle of training (Bachelor) show low and medium to high levels of quality of life and burnout from the start in their first year.

It is important to understand that no one can be effective in a job if the person himself does not have the necessary tools to flow through adversity. The implementation of programs to manage the global cognitive load of medical training in its initial stage is an urgent need that is involved in the development of social accountability in medical schools.

### *4.4. Social Accountability of Medical Schools by Offering Interventional Programs for Medical Students*

This study clearly indicates that medical students need advice on how to improve their learning strategies and time management, as well as how to improve their quality of life, to prevent burnout and to increase resilience in difficult times. It is the medical schools' social accountability to provide corresponding services, which would be even more important in the emergency of the COVID-19 health crisis. In addition, the educational process and training of medical students comprises various and different academic, health, social or administrative institutions of a community, although they are often completely separate entities. Nevertheless, under the coordination of the responsible medical school, social accountability towards the medical students ought also to include all those entities.

Here, the following interventional programmes for student services and student support are proposed. Firstly, the medical school ought to offer a programme for the management of the students' relevant cognitive load and for time management from the first year onwards in such a way that they become better equipped for the subsequent years of their studies. Secondly, the students deserve a programme for applying the most efficient and best-suited learning methods. Thirdly, given the tendency of decreased quality of life and increased risk of burnout as the students progress through their studies, a programme ought to be offered advising students of how to look after their mental and physical health to prevent deterioration of quality of life and burnout, and to improve resilience in difficult situations like the COVID-19 health crisis.

This study's results indicate that the weakness in year 1 is about how to learn, whereas in in years 2 and 3, perhaps due to the reported social isolation, the students lose confidence and suffer a worsening in terms of quality of life and burnout, i.e. extrinsic cognitive load.

One can think of this in terms of intrinsic and extrinsic cognitive load. Regarding the extrinsic load, it is imperative to develop regulated programs in all courses that favour the quality of life of students, prevent burnout and increase the level of resilience. For this, the creation of learning communities of no more than 10 students per group, would favour these objectives and reduce the degree of competition between them and allow the creation of stronger ties in the event of new health crises that lead to complete social isolation.

Regarding the intrinsic cognitive load of the programme, one should rethink about a revision of the program not only to

avoid duplication and increase the degree of integration between the different subjects, but also to adapt it to the changing needs of society and to a type of medical practice in an uncertain future. It is the social accountability of a medical programme to adapt the load so that society has efficient doctors.

### *4.5. Limitations of the Study*

This study was limited to students of the Bachelor of Medicine at the University of Fribourg. Therefore, the results may not be fully generalizable. Perceptions about the online learning environment, the quality of life, burnout and the resilience of students are a first approximation to the problem. Other more in-depth studies should be carried out.

## 5. Conclusion

One ought to be aware that medical education programmes are training doctors for an uncertain future, toward types of medical practices that are not yet known today and that are not predictable or expected. However, it ought to be the responsibility of medical schools to be accountable and to prepare medical students with the necessary tools to be able to face situations such as pandemics, climate change and new scenarios that today are not yet imaginable.

According to the results of this study, the pandemic has pointed out deficiencies in the preparedness for effective action in an emergency in the context of medical education. Especially, the students of the first cycle of training (Bachelor) suffer most due to their poor study management skills, and they experience reduced quality of life, as well as burnout, all from the beginning in first year. Consequently, it is urgent for medical schools to become aware of their social accountability toward their students, also by including the different academic, health, social or administrative institutions of a community. In that respect, medical schools ought to implement programmes for helping students to manage their global cognitive load of medical training, as well as for advising students in how to improve quality of life and resilience, and how to prevent burnout. For establishing efficient student support programmes, additional future studies may be needed, identifying specific deficiencies and best ways of implementing such programmes.

## References

[1] Boelen C, Heck Jeffery E. Defining and measuring the social accountability of medical schools. WHO/HRH/95.7.; 2015.

[2] Preston R, Larkins S, Taylor J, Judd J. Building blocks for social accountability: a conceptual framework to guide medical schools. BMC Med Educ. 2016; 16: 227.

[3] Fung OW, Ying Y. Twelve tips to center social accountability in undergraduate medical education. Med Teach. 2021: 1–7.

[4] Boelen C. A new paradigm for medical schools a century after Flexner's report. Bull World Health Organ. 2002; 80: 592–3.

[5] Gary, Nancy E., Ed., Boelen, Charles, Ed., Gastel, Barbara, Ed., Ayers W. Improving the social responsiveness of medical schools. Proceedings of the 1998 Educational Commission for Foreign Medical Graduates/World Health Organization Invitational Conference. Acad Med. 1999; 74: Svii-viii, S1-94.

[6] Fitzgerald M, Shoemaker E, Ponka D, Walker M, Kendall C. Global health and social accountability: An essential synergy for the 21st century medical school. J Glob Health. 2021; 11: 3045.

[7] Global consensus on social accountability of medical schools 2010.

[8] Ferrel MN, Ryan JJ. The Impact of COVID-19 on Medical Education. Cureus. 2020; 12: e7492.

[9] Ardekani A, Hosseini SA, Tabari P, Rahimian Z, Feili A, Amini M, et al. Student support systems for undergraduate medical students during the COVID-19 pandemic: a systematic narrative review of the literature. BMC Med Educ. 2021; 21: 352.

[10] The WHOQOL Group. The World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. Social Science & Medicine. 1995; 41: 1403–9.

[11] Maslach C, Jackson SE. The measurement of experienced burnout. J. Organiz. Behav. 1981; 2: 99–113.

[12] Paro HBMS, Morales NMO, Silva CHM, Rezende CHA, Pinto RMC, Morales RR, et al. Health-related quality of life of medical students. Med Educ. 2010; 44: 227–35.

[13] Cameron D, Dromerick LJ, Ahn J, Dromerick AW. Executive/life coaching for first year medical students: a prospective study. BMC Med Educ. 2019; 19: 163.

[14] Dyrbye LN, Power DV, Massie FS, Eacker A, Harper W, Thomas MR, et al. Factors associated with resilience to and recovery from burnout: a prospective, multi-institutional study of US medical students. Med Educ. 2010; 44: 1016–26.

[15] Dyrbye LN, Massie FS, Eacker A, Harper W, Power D, Durning SJ, et al. Relationship between burnout and professional conduct and attitudes among US medical students. JAMA. 2010; 304: 1173–80.

[16] Shanafelt TD, Boone S, Tan L, Dyrbye LN, Sotile W, Satele D, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. Arch Intern Med. 2012; 172: 1377–85.

[17] Dyrbye LN, Shanafelt TD, Gill PR, Satele DV, West CP. Effect of a Professional Coaching Intervention on the Well-being and Distress of Physicians: A Pilot Randomized Clinical Trial. JAMA Intern Med. 2019; 179: 1406–14.

[18] Seo C, Corrado M, Fournier K, Bailey T, Haykal K-A. Addressing the physician burnout epidemic with resilience curricula in medical education: a systematic review. BMC Med Educ. 2021; 21: 80.

[19] Lindgren S, Karle H. Social accountability of medical education: aspects on global accreditation. Med Teach. 2011; 33: 667–72.

[20] Sayek I, Turan S, Batı AH, Demirören M, Baykan Z. Social accountability: A national framework for Turkish medical schools. Med Teach. 2021; 43: 223–31.

[21] Alfonso Roca MT, García Barbero M. La responsabilidad social de las facultades de Medicina. Una exigencia inaplazable para adaptarse a las necesidades de la población. Educación Médica. 2021; 22: 99–105.

[22] Hong J, Jung I, Park M, Kim K, Yeo S, Lee J, et al. Attitude of Medical Students About Their Role and Social Accountability in the COVID-19 Pandemic. Front Psychiatry. 2021; 12: 645340.

[23] Singh R, Subedi M, Pant S, Rai P, Gupta K, Thapa A, et al. Perception towards Online Teaching-learning in Medical Education among Medical Students during COVID-19 Outbreak in Nepal: A Descriptive Cross-sectional Study. JNMA J Nepal Med Assoc. 2021; 59: 128–33.

[24] Stojan J, Haas M, Thammasitboon S, Lander L, Evans S, Pawlik C, et al. Online learning developments in undergraduate medical education in response to the COVID-19 pandemic: A BEME systematic review: BEME Guide No. 69. Med Teach. 2021: 1–21.

[25] Grover S, Goyal S, Sahoo S, Goyal S, Mehra A. Views of medical students about online classes started during the COVID-19 pandemic: An online exploratory survey from India. J Mental Health Hum Behav. 2021; 26: 62.

[26] Elmer T, Mepham K, Stadtfeld C. Students under lockdown: Comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. PLoS One. 2020; 15: e0236337.

[27] Rasmussen S, Sperling P, Poulsen MS, Emmersen J, Andersen S. Medical students for health-care staff shortages during the COVID-19 pandemic. The Lancet. 2020; 395: e79-e80.

[28] Aebischer O, Porret, Raphaël, Pawlowska V, Barbier J, Caratsch L, et al. Étudiant·e·s en médecine engagé·e·s au chevet des patient·e·s hospitalisé·e·s pour COVID-19. Rev Med Suisse. 2020; 16: 958–61.

[29] Dorji T, Tamang ST, Tilak TVSVGK. Self-learning on COVID-19 among medical students in Bhutan: A cross-sectional study. Heliyon. 2021; 7: e07533.

[30] Pelaccia T, Demeester A, Charlin B, Denef J-F, Gagnayre R, Maisonneuve H, et al. Le déploiement de la formation à distance au sein des facultés de médecine dans le contexte de la crise sanitaire liée à la COVID-19: et après? Pédagogie Médicale. 2020; 21: 173–4.

[31] Déclaration sur la formation pendant le COVID-19. 2020.

[32] État de Fribourg. Deuxième séance du Grand conseil canton de fribourg du 7 septembre 2016. Projet de décret 2015-DICS-24 Création d'un programme de master en médecine humaine à l'Université de Fribourg. 2016.

[33] Reeve C, Woolley T, Ross SJ, Mohammadi L, Halili SB, Cristobal F, et al. The impact of socially-accountable health professional education: A systematic review of the literature. Med Teach. 2017; 39: 67–73.

[34] Strasser RP, Lanphear JH, McCready WG, Topps MH, Hunt DD, Matte MC. Canada's new medical school: The Northern Ontario School of Medicine: social accountability through distributed community engaged learning. Acad Med. 2009; 84: 1459–64.

[35] Sassi N, Neveu J-P. Traduction et validation d'une nouvelle mesure d'épuisement professionnel: Le shirom-melamed burnout measure. Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement. 2010; 42: 177–84.

[36] Guihard G, Morice-Ramat A, Deumier L, Goronflot L, Alliot-Licht B, Bouton-Kelly L. Évaluer la résilience des étudiants en santé en France: adaptation et mesure de l'invariance de l'échelle CD-RISC 10. mee. 2018; 41: 67–96.

[37] Kubrusly M, Rocha HAL, Maia ACC, Sá AKdM, Sales MM, Mazza SR. Resiliencia en la Formación de Estudiantes de Medicina en una Universidad con un Sistema Híbrido de Ensenãnza y Aprendizaje. Rev. bras. educ. med. 2019; 43: 357–66.

[38] Tempski P, Bellodi PL, Paro HBMS, Enns SC, Martins MA, Schraiber LB. What do medical students think about their quality of life? A qualitative study. BMC Med Educ. 2012; 12: 106.

[39] Dyrbye LN, Thomas MR, Power DV, Durning S, Moutier C, Massie FS, et al. Burnout and serious thoughts of dropping out of medical school: a multi-institutional study. Acad Med. 2010; 85: 94–102.

[40] Karsenti T, Poellhuber B, Roy N, Parent S. The Impact of COVID-19 on Higher Education and Educational Technology – Part 1. RITPU. 2020; 17: 5–8.

[41] Gallegos PJ, Mistry B, Freshwater D, Mullen C. Continued professional development: A comparison of online vs. in-person workshops. Curr Pharm Teach Learn. 2021; 13: 770–5.

[42] Brockman RM, Taylor JM, Segars LW, Selke V, Taylor TAH. Student perceptions of online and in-person microbiology laboratory experiences in undergraduate medical education. Med Educ Online. 2020; 25: 1710324.

[43] Chen I-J, Chang C-C. Cognitive Load Theory: An Empirical Study of Anxiety and Task Performance in Language Learning. Electronic Journal of Research in Educational Psychology. 2009; 7: 729–46.

[44] Ruiz Martin H. Aprendiendo a aprender / Learning to Learn. 2021.

[45] Paas F, Renkl A, Sweller J. Cognitive Load Theory and Instructional Design: Recent Developments. Educational Psychologist. 2003; 38: 1–4.

[46] Zhao C, Hu Y. Reflections on Study Strategy Modifications Using Cognitive Load Theory and Dual Processing Theory in the First Year of Medical School. Med Sci Educ. 2021: 1–6.

[47] Alcaraz-Mor R, Vigouroux A, Urcun A, Boyer L, Villa A, Lehucher-Michel M-P. Qualité de vie au travail de jeunes médecins hospitaliers: satisfaits malgré tout… Sante Publique. 2019; Vol. 31: 113–23.

[48] Almeida GdC, Souza HRd, Almeida PCd, Almeida BdC, Almeida GH. The prevalence of burnout syndrome in medical students. Arch. Clin. Psychiatry (São Paulo). 2016; 43: 6–10.

[49] Aguilar-Maldonado SL, Gallegos-Cari, Andrea, Muñoz-Sánchez, Sinuhé. Análisis de componentes y definición del concepto resiliencia: una revisión narrativa. Revista de Psicologia. 2019; 22.

[50] Tempski P, Santos IS, Mayer FB, Enns SC, Perotta B, Paro HBMS, et al. Relationship among Medical Student Resilience, Educational Environment and Quality of Life. PLoS One. 2015; 10: e0131535.

[51] Greenhill J, Fielke KR, Richards JN, Walker LJ, Walters LK. Towards an understanding of medical student resilience in longitudinal integrated clerkships. BMC Med Educ. 2015; 15: 137.

[52] Najibi S, Carney PA, Thayer EK, Deiorio NM. Differences in Coaching Needs Among Underrepresented Minority Medical Students. Fam Med. 2019; 51: 516–22.

[53] Chehuen Neto JA, Toledo Sirimarco M, Botrel Baratti A, Sant'Ana Marques F, Sá Pittondo M de. Qualidade de vida dos estudantes de medicina e direito. HU Revista, Juiz de Fora. 2008; 34.

[54] Dyrbye LN, Thomas MR, Massie FS, Power DV, Eacker A, Harper W, et al. Burnout and suicidal ideation among U.S. medical students. Ann Intern Med. 2008; 149: 334–41.

[55] Dias AR, Fernandes SM, Fialho-Silva I, Cerqueira-Silva T, Miranda-Scippa Â, Galvão-de Almeida A. Burnout syndrome and resilience in medical students from a Brazilian public college in Salvador, Brazil. Trends Psychiatry Psychother. 2021.