Ph.D. Academic Life at the Time of the Coronavirus

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Abstract. Ph.D. students are an essential part of the academic world. They need to obtain new knowledge and skills while contributing to the advancement of their research field. This paper examines the way the academic life of Ph.D. students is affected by the pandemic COVID-19. Data for this study was collected through an online survey sent to the Ph.D. students of a department in a Scandinavian university. Data was then analyzed through a mixed (quantitative and qualitative) method. The questionnaire was distributed after one year of studying and working from the home office and far from an educational setup like physical classes, meetings, seminars, and conferences. The results show changes in how they meet their supervisors and other Ph.D. students and the type of tools they use for communications. The results also show that Ph.D. students face some challenges related to the home office, project-related activities like data collection and experiment, and contact with others like socializing, communication, and collaboration. To reduce the impact of the Coronavirus, Ph.D. students also suggested some solutions like having more online discussions with their supervisors and peer Ph.D. students, having a work-life balance, getting guidance and training from professionals, and being understood by the supervisors.

Keywords: COVID-19, Ph.D. Students, Challenges, Home Office.

1   Introduction

The outbreak of COVID-19 in 2020 brought a novel and unpredictable situation to our life. It led to the suspension of everyday life on a scale worldwide. However, as Aydemir and Ulusu (2020) stated, the scientific world is one the most affected areas among other disciplines and professionals. Since the COVID-19 pandemic started, there has been researching on how education and the scientific area have been affected. For example, Onyema, Eucheria et al. (2020) have reported the impact of COVID-19 on teachers, students, parents, and policymakers from different countries by doing quantitative research. In another study, Mahaye (2020) reviewed the applicability of Blended learning during the pandemic situation. While research on the impact of COVID-19 on education has a history no longer than one year, there has not been empirical research on the effects of the pandemic situation on the academic life of Ph.D. students. This study aims to identify the changes in the academic life of Ph.D. students because of the Coronavirus. Therefore, the main research question of this paper is:

RQ: How Ph.D.'s academic life is affected by pandemic COVID-19?

What follows in this paper is a brief background about COVID-19 and its impact on education. Next, we will explain the methodology of this research work and will provide the result afterward. The discussion section will elaborate more on the findings of this research. Finally, in conclusion, we will summarize the study and possible future work out of this study.

2 Literature review

2.1 COVID-19 and its impact on education

It has been almost over a year that the pandemic COVID-19 hit our society and caused a lot of challenges. On January 30, 2020, the World Health Organization declared the outbreak of novel coronavirus SARS-CoV-2 (also called COVID-19) a global health emergency or a pandemic situation (Velavan and Meyer 2020). The new virus has a very high infectious rate, "it can be transmitted in minutes through droplets or even touching surface metals or other materials which have been infected from a person which has respiratory problems" (Toquero 2020).

During the last year, governments worldwide have been struggling with the spread of COVID-19 in a way that currently, over one-third of the world's population is under some kind of lockdown(Franchi 2020). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), education is one of the many sectors that has been affected by the new virus (UNESCO 2020). As Toquero (2020) stated, because of the vulnerability in the school settings, many school closures have been implemented in a way that UNESCO (2020) reported as of April 06, 2020, over 1,5 million learners are affected in 188 countries. The pandemic COVID0-19 seriously impacted higher education as universities closed their campuses in response to the pandemic (Schleicher 2020). Alternatively, universities replace their face-to-face lectures with online learning. This means universities rebooted as "a home-based, technology-enabled, remote activity with zero physical contact" (Harris 2020). However, it required educators to respond overnight (Azorín 2020).

The COVID-19 pandemic disturbed the life of students in different ways(Daniel 2020). Students finishing one phase of their education and entering another, like those coming from schools to tertiary education or from tertiary education to employment, have been facing challenges. In a recent study at the Norwegian University of Science and Technology done during the first few weeks after the transition to online learning because of COVID-19, we reported several challenges students had in their learning process. Challenges with video-lectures, challenges with studying at home, challenges with group/project work, challenges with sharing workspace with friends, family, children, etc., are some of the challenges reported in this study (Lorås, Hjelsvold et al. 2020).

2.2 Ph.D. life and its challenges

One of the students' groups who are affected by the Coronavirus is Ph.D. Students. Ph.D. Students are an essential part of the academic workforce. According to Delamont,

Atkinson et al. (1994), Ph.D. students are considered an intermediary position. They need to obtain new knowledge and skills while contributing to advancing knowledge in their scientific field. It usually takes several years for a person to complete their Ph.D. During this period, Ph.D. students are not only enrolled as students. They have multiple work roles and different employment formats. Besides being a researcher contributing directly to research, Ph.D. students often work as research/teaching assistants, lecturers, tutors inside universities or in one range of professional or service occupations outside the universities(Pearson*, Evans et al. 2004). In an empirical study, Pyhältö, Toom et al. (2012) reported the problems that Ph.D. students face during their study as those of general working processes like motivation, self-regulation, academic writing, those of domain-specific expertise like constructing a theoretical framework, selecting research questions and methods, those of supervision and scholarly community like having a dysfunctional relationship with supervisors or other members of the community, and those of problems with resources like lacking funds or other resources such as research instruments.

2.3 Lack of study on Ph.D. life during COVID-19

According to Paula (2020), the lockdown and university closure could significantly impact Ph.D. students. These students can lose productivity because of living in stressful times, work remotely, or other concerns like caring for family and coping with mental and physical health (Paula 2020). The literature has not so far investigated the academic life of Ph.D. students and possible changes in their academic life during the Coronavirus.

3 Research strategy

3.1 Survey

In this research work, we used a survey research strategy. It is a systematic set of methods used to obtain the same kind of data from a large group of people (or events). It is used to identify a typical pattern in the data to generalize them to a large population (Lavrakas 2008). The survey research strategy has six different activities: data requirements, data generation method, sampling frame, sampling techniques, sample size, and response rate.

3.2 Data Requirements

February 26, 2020, the spread of the novel COVID-19 in Norway was confirmed (Reuters 2020). Then the number of infected cases increased rapidly during the march resulted in several safety measures to reduce the physical presence and increase social distancing. The Norwegian University of Science and Technology (NTNU), one of the topmost important universities in Norway with around 42000 students in three campuses in Trondheim, Gjøvik, and Ålesund, has decided to suspend all the physical activities and transit into online learning overnight on March 12 (Hjelsvold, Lorås et al. 2020). At NTNU, there has been some research and survey on how teachers and

students could deal with the fast transition to online learning (Hjelsvold, Nykvist et al. 2020, Lorås, Hjelsvold et al. 2020). However, there is still a need on how students are dealing with the current pandemic situation. This study is designed to identify how the academic life of Ph.D. students is affected by the spread of the new Coronavirus in our society. To have a view on the changes, we decided to generate data related:

- Directly to the topic: the possible changes in their meeting schedule with the supervisor, the tools they have used before and during the pandemic, potential changes in Ph.D. plans, relation with other Ph.D. students, the most significant challenges they have had, and the possible benefit they could see out of the current situation.
- Indirectly to the topic: gender, year of study, research group, Ph.D. period, and setup.

3.3   Data Generation Method

To collect data, we decided to design an online questionnaire. We used Nettskjema[1] as the online survey system, which NTNU approves for collecting data through online questionnaires. The questionnaire contained 14 multiple choice questions and six open-ended questions. The questionnaire is designed by the authors and then sent to the research committee in the department to check and give their comments and feedback.

3.4   Sampling Frame

The questionnaire was then sent to all Ph.D. students at the computer science department at NTNU almost one year after the first signs of covid-19 infectious in Norway. The link to the survey was sent through email to the Ph.D. students and invited them to participate in the survey. A secondary email was also sent after two weeks as a reminder to increase the participation rate.

3.5   Sampling Techniques

We sent the questionnaire to all the Ph.D. students in the computer science department. It was students themselves to choose whether to participate in the survey or not. So, the sampling technique in our research was random as we did not know which group of Ph.D. would participate in the survey.

3.6   Sample Size and Response Rate

Of 140 Ph.D. students doing their doctoral study at the time of the distribution of the questionnaire, 47 participated in this survey and submitted their responses. Therefore, the answer was 34%.

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[1] https://nettskjema.no

4 Results

4.1 Descriptive Statistics of the Sample

Table 1. Ethnographic Questions

Variable	Percentage
Gender	
Male	60%
Female	40%
Research Group	
ISSE	51%
DART	17%
COMP	15%
ColourLAB	9%
AIT	8%
Ph.D. Period	
Three years	19%
Four years	81%
Year of Study	
First-year	34%
Second-year	19%
Third-year	11%
Fourth-year	19%
Fifth-year and more	17%
Type of Ph.D.	
Departmental Ph.D.	49%
A part of project/Center	51%
Ph.D. Setup	
Working independently	53%
A part of a project but working independently	45%
Working jointly on a project	2%

Table 1. presents descriptive statistics of the participants. The majority of the participants are male with a 60% rate, while 40% were females. The computer science department at NTNU has five research groups distributed into two campuses in Trondheim and Gjøvik. Applied Information Technology (AIT), Computing (COMP), Data and Artificial Intelligence (DART), and Information Systems and Software Engineering (ISSE) located in Trondheim, and Colour and Visual Computing Laboratory (ColourLab) located in Gjøvik.

Almost half of the Ph.D. students who participated in this survey were from the ISSE group. 17% and 15% of participants were from DART and COMP research groups,

respectively. ColourLab and AIT Ph.D. students had the least participation in this survey, 9% and 8% in return. Participants tended to have a four-year contract with NTNU (81%), though 19% of Ph.D. students have a three-year Ph.D. period. One-third of participants were in their first year of a Ph.D. program, while 19% were in their second and the same percent in their fourth year. Just 10% of them were in the third year of the Ph.D. project. Although the Ph.D. period at NTNU generally at maximum is four years, 17 percent of respondents were in the fifth year or more.

More than 50% of Ph.D. students in this survey were funded by external projects or centers, though 49% of them were departmental Ph.D. students and funded by the department of computer science. While 53% of participants have been working independently, 45% of them were a part of a project but working independently. Just 2% of Ph.D. students were involved in joint projects and working together.

4.2 Ph.D. academic life before and during a pandemic situation

Fig. 1. Meeting with Supervisors Before and During COVID-19

As summarized in Fig. 2, over one-third of Ph.D. students responded that they had no fixed schedule to meet their supervisors. Around 25% had set a schedule to meet their supervisors once a week. Equally, 20% of them had planned to meet their supervisor more than once a week or every two weeks. However, the pandemic caused more fixed schedule meetings, particularly weekly-based meetings between Ph.D. students and their supervisors. Around 45% of Ph.D. students have met their supervisor once a week. The Corona caused a reduction (almost 50%) in the number of Ph.D. students who met their supervisors more than once a week. Before the Corona, 20% met more than once, while just a bit more than 10% did the same during the pandemic.

As shown in Fig. 2, email was prominent for contacting the supervisors among Ph.D. students (n=40) before COVID-19. However, the number of Ph.D. students who

reported that they have been using email for communicating with their supervisors during the Corona dropped to 25 (almost 38% less). While there have not been significant changes in the usage of "phone calls" and "live chat tools", the number of students who used video-conferencing tools from 24 before the pandemic increased to 37 Ph.D. students during the pandemic. This shows a 35% increase in the usage of video-conferencing tools.

	Email	Phone Call	Live Chat Tools	VideoConferencing Tools
before	40	4	5	24
after	25	3	5	37

before   after

Fig. 2. Tools for Communicating with Supervisors Before and During Pandemic COVID-19

66% of Ph.D. students who participated in this survey responded that because of the outbreak of COVID-19, they have less communication with other Ph.D. students. However, 32% of them acknowledged that their contact with other Ph.D. students was the same as before the pandemic. Just 2% of Ph.D. students reported that their communication with other peers was even more than before the COVID-19 pandemic.
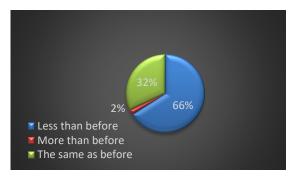

Fig. 3. Communication with Other Ph.D. students

4.3 The biggest challenges during the pandemic COVID-19

Fig. 4. The Biggest Challenges

As shown in Fig. 4, the most significant challenges Ph.D. students on our study have had are communication, demotivation, home office, distraction, and isolation. Ph.D. students lost the chance of meeting new researchers in their field of research because they could not attend meetings, conferences, and general physical events. Ph.D. students reported that demotivation is another common challenge that they have been facing during the pandemic situation. Some linked the problem of not being motivated to the home office:

[Ph.D. Student]: *"Working atmosphere at home is not motivating. And even though I am communicating with my supervisors, it is hard to develop ideas online. This is much easier when one spends half a day together in a room with a blackboard."*

Isolation was another challenge for Ph.D. students:

[Ph.D. Student]: *"The social isolation is probably the hardest. Not being able to casually discuss research issues, brainstorm ideas/thoughts, ask for second opinions and airing frustrations/happy news makes the days longer. In addition, the loss of opportunity to meet and engage with the international community is a challenge for my project that I don't really know how to solve."*

Some of the Ph.D. students have also found it challenging to focus and their work. They have been easily distracted; some linked this problem to the situation they have had with their home office:

[Ph.D. Student]: *"Difficult to maintain focus when working from home, lost focus because of working from home."*

Ph.D. students who participated in the survey also mentioned other challenges during the corona time. These challenges are work-life balance, the cancellation of academic events, delay in their research, lack of efficiency, data collection and experiment problems, collaboration and discussion with other researchers, and socializing.

4.4 How to reduce the challenges

Considering the challenges, most of the participants were not sure how to reduce the obstacles. However, some of them shared their suggestions regarding some of the

challenges mentioned earlier. Ph.D. students suggested having more communication and cooperation to address the communication challenge, which must be established online. Some others suggested having more discussions during the online event, like virtual conferences, instead of just having pre-recorded presentations:

[Ph.D. Student]: *"I wish online conferences were geared more towards meeting other people than just watching pre-recorded presentations."*

To address the isolation challenge, the administration in the department has initiated the morning coffee among employees that Ph.D. students were a part of it. However, some Ph.D. students in this survey suggested having more online gatherings among Ph.D. students:

[Ph.D. Student]: *"More online gatherings among Ph.D. students. I think it should be orchestrated from the administration because setting up such fora as a Ph.D. student has a lot of challenges not knowing the institution so well or the people etc."*

[Ph.D. Students]: *"having more online social activities in the department can help."*

Regarding home office challenges, some participants have suggested interesting solutions:

— Structuring the workday as before,
— Limiting working in the evening and weekends,
— Trying out low-bar online alternatives, like internal forum or likewise,
— Getting guidelines and training from experienced professionals about increasing concentration and efficiency when working from home could help.

The supervisors' understanding and changing the current guidelines and instruction based on the pandemic situation are other suggestions participants submitted in the response:

[Ph.D. Student]: *"I feel it would have been very helpful if the existing guides and instructions were modified to let me know that everything would be functioning more slowly and with difficulties, so I could prepare and act well in time. As it is now, everything is referring to the infrastructure "from before" and you're supposed to adjust as you go along, which is a bit difficult if you're brand new."*

4.5 Impacts on Ph.D. plans

The responses show that Ph.D. students are struggling with the delay they may have in their Ph.D. students. Most of them report that the outbreak of COVID-19 causes slow progress in their research work differently. Some had to cancel some part of their project, some could not collect data because of difficulties they had, some could not do fieldwork, and some could not go abroad for a stay /visit in another institution planned in their project.

[Ph.D. Student]: *"Some of the activities I had planned in my Ph.D. Students are canceled; I am a bit unsure how I will manage them."*

[Ph.D. Student]: *"It is definitely affecting me negatively as my fieldwork is delayed, I can't travel to conferences as well as there's very little interaction with my colleagues."*

[Ph.D. Student]: *"At this time, there is no affection on my Ph.D. plans. Most of the conferences are turned into online, and the dissemination is on track. The only issue is that part of my Ph.D. is to go abroad for a secondment, which is now postponed until further notice."*

[Ph.D. Student]: *"Some of the activities I have planned in my Ph.D. are canceled; I am a bit unsure how I will manage them."*

While some are not sure about the impact of the pandemic situation on the Ph.D. plan, they are worried about the quality of their research work.

[Ph.D. Student]: *"It is not foreseeable. Publication-wise it is still okay, but quality-wise it suffers."*

4.6 Benefits/opportunities that may come out of this situation.

While some participants were struggling with the pandemic situation, others could have benefited from this situation. The outbreak of COVID-19 forced the conferences to be virtual. This is one of the main advantages that Ph.D. students in our survey mentioned. They have not had to spend time travel long ways to reach the place of the conferences. Some also identified that it had provided opportunities to connect to people who are at a distance.

[Ph.D. student]: *"more opportunities for communication and cooperation with people that are far."*

Some Ph.D. students also mentioned that they could save their time by not commuting the distance between home and the office at the university. Flexibility is another advantage that participants identified.

4.7 Canceled events

Of all participants, 30 Ph.D. students identified that at least one conference they wanted to attend and got canceled because of the Coronavirus. While most of the conferences worldwide tried to turn into virtual settings, Ph.D. students lost the chance of physical attendance and meeting new researchers in the same field during the conference time. As already mentioned, some Ph.D. students have been suffering from the cancellation of research activities in the project. 19 Ph.D. students reported that they are a part of this group. Visit another university and stay abroad is also another event the have gotten canceled because of COVID-19. These two were in the Ph.D. plan of 19 and 18 Ph.D. students, respectively. Seminars, workshops, and summer school are other events that participants in this survey reported were among their project plans and canceled.
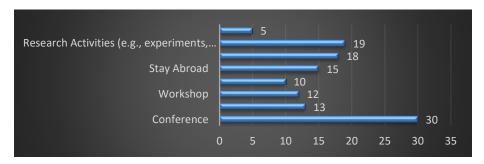
Fig. 5. Canceled events because of the COVID-19

4.8 The required assistance to finish the Ph.D. program

The sample Ph.D. students in this survey mostly expected their supervisors to help them be motivated, collaborate, and understand the pandemic situation by giving positive feedback and backing Ph.D. students up to follow their research work properly. Ph.D. students reported that they need help structure their time and work based on the novel situation during the Coronavirus. They also mentioned that they need to have social interaction with other to discuss their thought and plans. Reaching people to interview for collecting data is another assistance Ph.D. students responded to this question.

4.9 Possible changes in Ph.D. plans if the pandemic situation happened to continue

While most of the Ph.D. students were unsure about the possible changes in their Ph.D. plans because of the unpredictability of the pandemic situation, some of them reported different changes in the Ph.D. plans. Those who planned to do experiments in their study answered that they might change their experiments or how they will do them. Some replied that they might apply for an extension in the Ph.D. period because of the delay caused by the pandemic situation and not having access to resources, the cancellation of some events, and the planned activities. Removing some parts of their projects and rethinking the data acquisition plan were other possible changes participants mentioned in their responses.

4.10 Applying for an extension to Ph.D. students' contracts

As illustrated in Fig. 5, a total of 45% of respondents were unsure about applying for an extension in their Ph.D. This is comparable with 34% of Ph.D. students will not and 21% who will apply for an extension in their Ph.D. students.
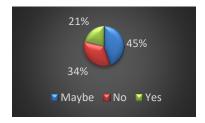
Fig. 6. Apply for an extension to the Ph.D. contract

5 Discussion

Our findings in this research show that Ph.D. students' academic life has been affected in different ways. University closure caused having a fixed schedule for meeting their supervisors became a trend among Ph.D. students. Also, there was a change in the tools they have used for contacting their supervisors. While email was the first most used communication tool before the pandemic, video conference tools became more common among Ph.D. and their supervisors.

Collaboration among Ph.D. students has a long tradition at NTNU. Meeting other Ph.D. students at the coffee room and discussing the Ph.D. project was common among Ph.D. students before Corona. In many cases, it resulted in some joint research work. The COVID-19 caused Ph.D. students to meet each other less than before, and most Ph.D. students recognized it in the relationship with other Ph.D. students.

The transition to online learning at NTNU happened overnight on March 12, 2020. All the physical and campus-based activities were canceled. All the students, including Ph.D. students, had to start learning from home. This caused Ph.D. students to feel isolated from each other as they had to work from home. The type of challenges that Ph.D. students had during the COVID-19 is different from students in other levels of studies (Lorås, Hjelsvold et al. 2020). As mentioned above, Ph.D. students have a double role during their study year: studying for a Ph.D. degree while working as researchers. This makes it harder for Ph.D. to concentrate on the study and research. This study shows that some of the activities related to Ph.D. projects like data collection and experiments faced problems.

While Aydemir and Ulusu (2020) suggests using the pandemic opportunity to widen their knowledge and reading more papers related to their works, Ph.D. students in our study also suggested several solutions in terms of online and virtual gathering, having guidelines from professionals and being understood by their supervisors, change in the Ph.D. plans, and applying for an extension in their Ph.D. students. Our findings also show that being affected by COVID-19, some changes in the Ph.D. plans are also foreseeable.

5.1 Research limitation

The main limitation of this study is the size of the sample Ph.D. students who participated in the survey. We distributed the survey link among the Ph.D. students in one

department, and of almost 140 Ph.D. students at that time, only 47 responded to the questions. Most of the respondents were from Trondheim campus and one third of them were first year Ph.D. students. However, the survey design and the questions selected from Ph.D. students allowed us to obtain data in the unique situation that Corona brought us.

5.2   Practical implication

Currently, at the time of writing this report, countries are heading toward vaccination, and hybrid working type (some days from home, someday from the office) is becoming dominant among Ph.D. students. However, it is predictable that for some time, the life of Ph.D. students would still be affected by the pandemic COVID-19. The findings of this study can help the Ph.D. students understand the possible challenges better and find the solution that works in their case. University administration can also use this study's findings, for example, to provide more structured virtual meetings and events to let their Ph.D. students meet each other.

6   Conclusion

This study has explored the effects of the pandemic COVID-1 on the academic life of Ph.D. students. Through a mixed-method analysis of survey data, we found that the life of Ph.D. students is affected in several ways: Demotivation and isolation because of the home office, losing communication and collaboration because of not having physical meetings and conferences, not being able to meet new people in their research field and having a problem with project-related activities like data collection and experiment. A follow-up study and/or a more extensive study would confirm the finding of this study. It can extend this research's aim to identify the challenges of working in a hybrid style and possible solutions to address those challenges.

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