

Reinventing roles: the new paradigms in geoinformation teaching and research in social isolation and the experiences of the Postgraduate Programme in Geodetic Sciences at UFPR-Brazil

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Abstract:

The social distancing and consequences of the pandemic of COVID-19 affected teaching and research globally. In Brazil, the pandemic management was very poor, resulting in a long period of social isolation, closed universities and political uncertainties regarding the purchase of vaccines and the decrease in cases and deaths. As a result, Brazil arrived in October 2021 with 600,000 deaths and the 9th country in the number of deaths/inhabitants (<https://www.worldometers.info/coronavirus/>). Additionally, we live in a period of low investment in Science and Education and very negative social indicators. This entire scenario deeply affects the teaching and research scenario in the country.

The post-graduation program in Geodesic Sciences (PPGCG) of UFPR has been in totally remote activities since April 2020. The Federal University of Paraná is public and free, and postgraduate students depend basically on federal government scholarships for survival. In the exchange rate of October 2021, the monthly value of the scholarship is about US\$ 270.00 for master's students and US\$ 399.00 for doctoral students. This value has been frozen for eight years, despite the accumulated inflation of 61.86% (IBGE). It is a postgraduate program with 50 years of history in the concentration areas of Geodesy and Surveys, Photogrammetry and Remote Sensing and Cartography and Geographic Information Systems. It has about 80 students in the Masters and PhD courses and 17 teaching staff members. As there are few programmes with this profile in Brazil and the global south, it has students from all over the country, plus about 20% of international students, from Latin America and Africa.

In this text, we seek to present the results of a survey with students and students about their views on remote teaching and research and bring experiences in disciplines and short courses held in the period. Our goal is to reflect the difficulties presented in the period, besides bringing successful experiences that were carried out and can be replicated in the future, thinking about adapting to the new reality that awaits us in the post-pandemic.

Firstly, we present the results of a consultation conducted with students (with 78 responses) in October 2020 and with 17 lecturers in April 2021. Both forms were done using Google Forms and had similar questions. Among the students, 29.5% responded that they depended on the computers in the labs to work (and did not have access, the University was closed). In addition, they reported difficulties with the internet connection, when working environment, need for child and elderly care, and some had become ill with COVID 19. Fortunately, there were no deaths among the lecturers and students. However, about 50% of the students and 35% of the teaching staff stated that the period of social distance affected their research. In addition, problems were reported with field trips (as a significant part of the PPGCG is connected to surveys), the lack of computers and software licenses, and the difficulty of carrying out user tests (mainly among Cartography and GIS students).

Next, a question was asked about the remote classes, asking to rate the experience from 1 (totally dissatisfied) to 5 (totally satisfied). Figures 1 and 2 below show the student and lecturer evaluation. In this question, it can be seen that the evaluation of the groups was similar, between neutral and slightly positive.

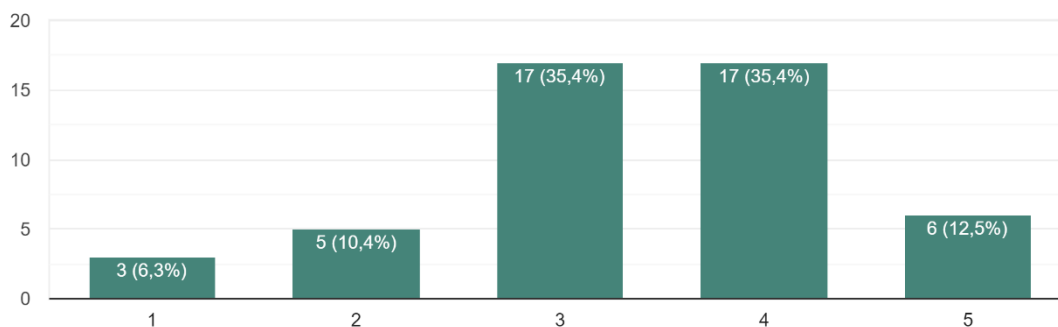


Figure 1. PPGCG Students' evaluation of the remote classes.

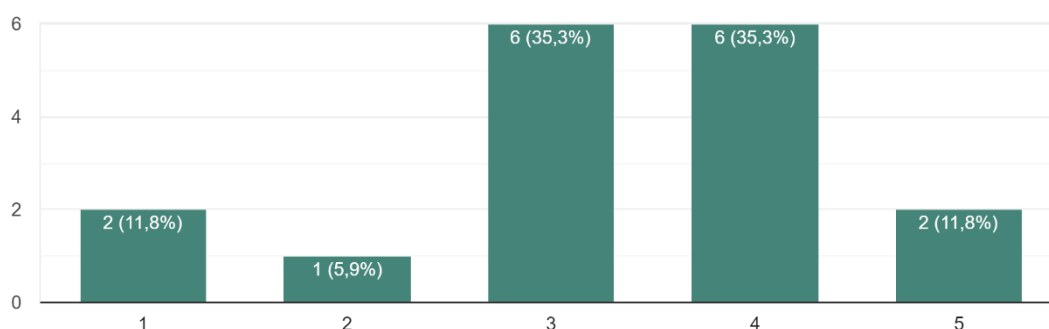


Figure 2. PPGCG Teaching Staff' evaluation of the remote classes.

Finally, it was asked how mental health was affected during the pandemic, ranging from 1 (Not Affected at all) to 5 (Completely affected). In this case, it is noticeable that the students felt much more affected (Figure 3) than the teachers (Figure 4).

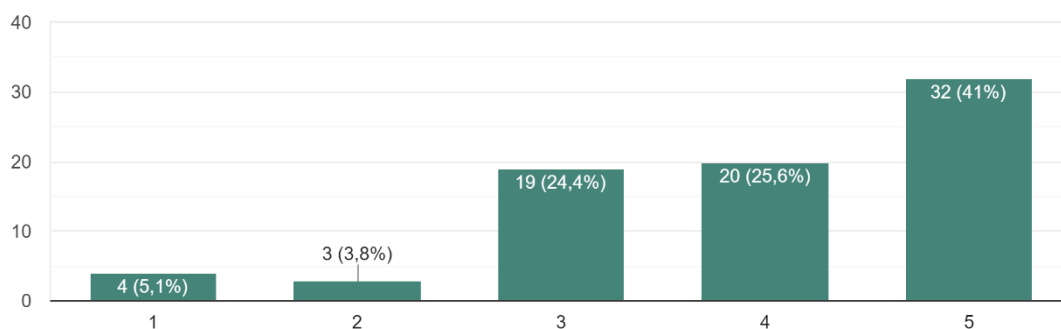


Figure 3. PPGCG Students' assessment of how much their activities have been affected by mental health issues during the pandemic

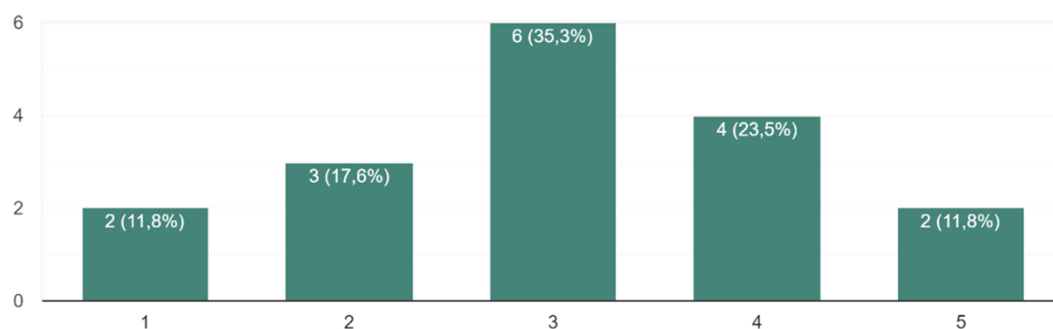


Figure 1. PPGCG Teachers' assessment of how much their activities have been affected by mental health issues during the pandemic

We also generated word clouds (www.wordclouds.com) with the responses to the open-ended question about the perception of how social distancing affected the academic performance of students and faculty (Figure 5).



Figure 5. Description of the social distance effects on the academic performance, in students (left) and teachers (right)

In addition to the experiences reported in the two surveys conducted, several changes have taken place in the life of our academic community. The courses, held remotely, could count on students and professors invited from all over Brazil and other countries. In this aspect, the access to knowledge and the cooperation between research groups could be widened. We have also had experiences in more interdisciplinary courses, with mixed classes of students from Cartography and Economics, or Graphic Expression, with many benefits for the interdisciplinarity in teaching. During the pandemic, our chapter of the YouthMappers network grew and consolidated, contributing to the growth of 10 other Brazilian universities, the organisation of various mapathons, including with colleagues from Mozambique. The courses created in an open way for the community attracted interested people from universities, NGOs and companies from all over the country who would not have been able to travel to Curitiba in other opportunities. Brazil is a country of continental dimensions, and actions such as this contribute to reducing regional inequalities.

Finally, the classroom experience was valuing more active learning, problem-solving and the use of free and open-source software. Our group also organised two remote scientific events, the Brazilian Symposium of Spatial Data Infrastructure and the Brazilian Colloquium of Geodetic Sciences. They were free and online. This new way of doing scientific events proved to be much more inclusive than the previous versions. Another positive aspect was the accomplishment of selecting new students and defences of theses and dissertations remotely. Thus, we expanded the community's access to the knowledge generated at the University.

During the social isolation period, research involving tests with users had to be adapted not to be suspended or interrupted due to the deadline. Three surveys can be cited, Pisetta (2021), Araujo (2021) and Martins (2021). In common, the research involved evaluations with users' participation and was initially programmed for face-to-face tests having to be developed by remote means and with free access tools.

The research of Piseta (2021) was carried out in three stages. The first evaluated the understanding of pictorial symbols from the presentation of these in static images in context of use, from which the participants indicated the meaning of each of the symbols presented. The second test was the Comprehension Test, in which the features that did not have the pictorial symbol semantically validated by the volunteers' answers were identified. Then the Production Test was performed to produce pictorial symbols for these features in a systematised way, taking into account the Gestalt and Semiotic Theory.

In the work of Araujo (2021), the research objective was to test and propose a set of symbols of buildings and transportation systems for the Brazilian reference mapping at large scales to be used in a multi-scale context. As in Pisetta (2021) work, the tests with the participating users had to be performed entirely remotely. To this end, the proposed maps' symbology was tested from reading tasks in the context of use. The test was developed according to the Think Aloud method (with moderation), where the participant says aloud his/her line of thought to the test moderator during the performance of the tasks. Before applying the method, Araújo (2021) prepared a script of application, which

allowed greater control since the test was adapted in a virtual platform, where the interactivity between the participant and the researcher was performed through communication software by camera and microphone remotely.

The research of Martins (2021) evaluated if UFPR Campus Map web maps, developed for desktop accessed through mobile devices, could maintain users' interaction and the degree of satisfaction of use of the platform. Initially, different groups of users were scheduled for the usability tests. Then, six experts were selected to verify the system heuristics and a set of 34 volunteers for use case tests. The evaluation methods included questionnaire assessments and Think Aloud, which was later replaced by the guided interview. The guided interview method was adopted due to the difficulty of structuring Think Aloud consistently in a remote format and without the infrastructure of the University, which was closed. Therefore, from home and with tools such as Skype and Google Meet, Martins (2021) conducted the interviews and recordings while the volunteers interacted with the UCM platform via desktop or smartphone. After the end of the sessions, which on average lasted fifteen minutes, the questionnaire developed using GoogleForm was sent to the volunteers' emails. Martins (2021) expresses the difficulty of co-opting volunteers during the pandemic. However, more importantly, it was the difficulty of keeping the participants focused on the test, without interruptions in the places where they were performing the evaluations and answering the questions of the last stage of the evaluation. Thus, a significant part of the tests was discarded.

In common, the researches of Piseta (2021), Araújo (2021) and Martins (2021) have the method of disclosure and co-optation of volunteers carried out by the internet via WhatsApp, Instagram and email; the scheduling for the realisation of the tests in order to leave the volunteers more at ease of when and where to perform their participation; the virtual meeting platforms (Google Teams, Skype, Hangouts, etc.) accessible and without considering the university infrastructure.

These experiences show us the potential for reinvention that the academic community faced during these 20 months of restrictions due to the pandemic. If, on the one hand, the research could be redefined, classes adapted, and administrative processes made more flexible, the effort on everyone's mental health was so great that we still do not have the exact proportion of the consequences.

We learned how the virtualisation of processes could bring gains in inclusion, cooperation and accessibility. Nevertheless, the lack of conviviality among colleagues, in the laboratories, of the advisors and the students daily, and the pressure and uncertainties arising from the situation made us more fragile. It was an even heavier challenge for people in charge of small children or elderly parents, household chores, and those affected economically, besides those who went through the tragedy of losing family and friends. In the end, resurgence after this period as a community, rekindling the bonds, maintaining the positive points learned will be the challenges for the coming months and years in our community.

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