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What Matters is the Quality of Interactions: Redesigning Professor-Student Relationships in Post- Pandemic Higher Education

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Abstract

This cross-cultural study examines how Pedagogy students in Brazil and Germany perceived professor-student interactions during Emergency Remote Teaching (ERT) caused by the pandemic. The analysis focuses on cognitive, affective, and behavioural dimensions. The research involved 108 Pedagogy students from Brazil and Germany, using mixed methods: a comparative quantitative survey and semi-structured interviews, analyzed through Objective Hermeneutics. Results revealed that ERT prompted shifts in pedagogical interactions, highlighting a horizontal teaching model where professors retain expertise while fostering knowledge co-construction. Empathy and flexibility were core competencies, recognized by 90% of Brazilian and 68% of German students. Synchronous interaction - virtual or face-to-face - proved relevant for learning effectiveness and student well-being. Technology enhanced relational learning without replacing human contact. These findings indicate that institutionalizing quality relational practices may enhance post-pandemic higher education. The study suggests implications for institutional culture, faculty development, and policy design regarding relational quality in contemporary higher education.

Keywords

Post-Pandemic education, professor-student relationship, objective hermeneutics, pedagogical innovation, covid-19

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Lo que Importa es la Calidad de las Interacciones: Rediseñando las Relaciones Profesor-Estudiante en la Post- Pandemia

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Resumen

Este estudio transcultural examina cómo los estudiantes de Pedagogía en Brasil y Alemania percibieron las interacciones profesor-estudiante durante la Enseñanza Remota de Emergencia (ERE) provocada por la pandemia. El análisis se centra en las dimensiones cognitiva, afectiva y conductual. La investigación involucró a 108 estudiantes de Pedagogía mediante métodos mixtos: una encuesta cuantitativa comparativa y entrevistas semiestructuradas, analizadas a través de la Hermenéutica Objetiva. Los resultados revelaron que la ERE impulsó cambios en las interacciones pedagógicas, destacando un modelo de enseñanza horizontal en el que los profesores mantienen su expertise mientras fomentan la coconstrucción del conocimiento. La empatía y la flexibilidad fueron competencias centrales, reconocidas. La interacción sincrónica - virtual o presencial - demostró ser relevante para la efectividad del aprendizaje y el bienestar estudiantil. La tecnología potenció el aprendizaje relacional sin reemplazar el contacto humano. El estudio aporta elementos para sugerir implicaciones en la cultura institucional, el desarrollo docente y el diseño de políticas educativas que prioricen la calidad relacional como pilar fundamental de la educación superior contemporánea en uno contexto de post-pandemia.

Palabras clave

Educación Post-Pandemia, relación profesor-estudiante, hermenéutica objetiva, innovación pedagógica, covid-19

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Globally, numerous studies have documented perceptions, actions, and initiatives related to Emergency Remote Teaching (ERT) during the COVID-19 pandemic lockdowns (2020-2021). In general, these studies and research have shown that, unlike planned in-person and distance learning experiences, many educational institutions responded with hastily designed remote instructional models by educational institutions, governments, and other entities responsible for formal education.

In the post-pandemic context and with the return to in-person classes at universities, the authors of this article investigated how Pedagogy students in Brazil and Germany perceived professor-student interactions during Emergency Remote Teaching (ERT) caused by the pandemic, focusing on cognitive, affective, and behavioural aspects. Our central research question is: Did interactions during ERT bring about significant transformations in teachers' and students' cognitive, affective, and behavioral relationships?

This research was conducted through a partnership between the São Paulo Research Foundation (FAPESP) and the research program titled United Nations Research Roadmap for the COVID-19 Recovery. The United Nations launched this program in November 2020, aiming to develop research in strategic areas for post-pandemic recovery toward a more just, resilient, and sustainable future, as outlined by the Sustainable Development Goals (SDGs).

This methodology allowed us to examine professor actions and student perceptions regarding teaching and learning relationships during 2020-2021.

These diagnoses, prognoses, and analyses align with an analytical and critical investigation that holds significance in contributing to public policy proposals aimed at confronting and mitigating impacts of the COVID-19 pandemic. In this context, the aim of this article was to compare the forms of cognitive and affective interaction among Pedagogy students from two public universities - one in Brazil and other in Germany - between 2020 and 2021, during which synchronous and asynchronous classes were conducted within the context ERT. Results illuminate how institutional contexts shaped cross-national similarities and differences in learning and online interaction patterns between Brazilian and German students. Furthermore, it is argued that the so-called horizontal guidance of professors has emerged as a relevant element in fostering solidarity and empathy with students, not only during lockdown periods and ERT but also in shaping in-person relationships within the context of the so-called “new normal”.

Research Methodology

General Background

We analyzed the data using a sequential explanatory mixed-method approach (Creswell, 2013), focusing on the experiences of Brazilian and German students during the Emergency Remote Teaching (ERT) period at universities in both countries. We selected this design because it provided both breadth and depth. The quantitative phase offered an overview of student perception patterns, while the qualitative phase enabled in-depth interpretation. This integration enhanced construct validity and explanatory power by combining numerical trends with interpretive insights.

The quantitative phase consisted of a cross-sectional study with spontaneous responses from students, who were invited to express their agreement or disagreement according to the extent of their perceptions regarding nine assertions related to three categories of analysis: (1) Teaching mode, (2) Student learning, and (3) Professor behavior. In Brazil, quantitative data were collected using Google Forms, while in Germany, the open-source software Lime Survey was employed. We conducted a polychoric correlation analysis among questionnaire items and performed a multiple correspondence factor analysis. Interview data were analyzed using an adapted Objective Hermeneutics approach (Wernet, 2006). Eight semi-structured interviews were conducted, equally distributed between Brazilian and German students. The integration between quantitative and qualitative phases followed a connecting strategy, in which the quantitative results informed the selection of interviewees and the formulation of guiding questions, and a merging strategy, whereby convergences and divergences between survey and interview data were systematically compared during the interpretive stage.

Sample

The research was based on the perceptions of Brazilian and German Pedagogy university students who experienced ERT in 2020 and 2021. We used non-probabilistic, voluntary response sampling from all Pedagogy students enrolled in partner universities during 2020–2021.

To define the sample, a 95% confidence index was calculated concerning the total number of Brazilian and German students, with a $\pm 2\%$ margin of error. The sample consisted of 108 respondents, with the following distribution: 61 students from Brazil and 46 from Germany. Recruitment occurred through institutional email lists and learning management systems using standardized information sheets and informed consent forms. Inclusion criteria were: being enrolled in a Pedagogy degree; attending at least one semester of ERT during 2020–2021; being 18 years or older. Students who did not complete the questionnaire or did not provide consent were excluded from the analysis.

This study represents a focused analysis from a larger project examining both Pedagogy and Computer Science students from both countries regarding the relationships established between students and their professors during the period of remote teaching (2020–2021). In that study, students expressed their opinions using a Likert scale on three axes: (1) relationships with their professors, (2) psychological distress observed during the pandemic lockdown, and (3) the development of a critical digital citizenship, particularly to combat the dissemination of fake news related to the COVID-19.

Regarding the research presented in this article, a specific focus was established to analyze how the relationships between students and professors in Brazil and Germany impacted the cognitive and affective dimensions of students during the ERT period. Therefore, out of the initial 30 Likert scale items, nine related to student-professor relationships in both countries were selected. A pretest for validation and adjustments revealed a Cronbach's alpha of 0.8076, indicating a high reliability index for the instrument. Prior to the application of the Likert scale and semi-structured interviews, approvals were obtained from the ethics committees for research involving human subjects in both countries (CAAE: 61125622.4.0000.5504). The

sociodemographic profile was considered and is presented in the following section to qualify our sample. The mean age of Brazilian students was 21.7 years, among whom 55 identified as female, five as male, and one as other. The average family income ranged from one to three minimum wages, equivalent to \$251 to \$753. The mean age of German students was 24.9 years, among whom 40 identified as female, five as male, and one as other. Similarly characterized by a female majority, the German Pedagogy course had an average family income ranging from 3 to 5 minimum wages, corresponding to \$5.318 to \$8.863. As the sample was non-probabilistic and based on voluntary participation, the results cannot be generalized to all Pedagogy students in Brazil and Germany; however, they offer analytically rich insights into the experiences of students who engaged with ERT in these specific institutional contexts.

Instrument and Procedures

The quantitative phase followed the guidelines of attitude and perception measurement studies based on the Likert scale, which makes it possible to identify both the direction and intensity of participants' attitudes through the analysis of 30 items of the questionnaire (DeVellis, 2016).

Therefore, out of the initial 30 Likert scale items, nine related to student–professor relationships in both countries were selected. Before large-scale administration, the questionnaire underwent content validation by a panel of experts in education and educational psychology, who assessed the clarity, relevance and cultural adequacy of the items, leading to minor wording adjustments. These experts in education and psychology compose the multidisciplinary research team responsible for the broader project to which the present study is linked, which ensured that content validation was consistent with the theoretical and methodological framework of the larger investigation. A subsequent pilot test with a small group of students (not included in the final sample) yielded a Cronbach's alpha of 0.8076, indicating a high internal consistency and supporting the reliability of the instrument.

Regarding the quantitative analysis, the procedure of Multiple correspondence analysis (MCA) was used. MCA enables the simultaneous analysis of multiple variables related to the Likert scale items, establishing patterns of association among the assertions of the surveyed items (Lebart et al., 1995; Härdle et al., 2015; Artes & Barroso, 2023). Data analysis was compiled using the RStudio software (Posit, 2023). A comparative and multifactor correspondence analysis was conducted to enhance the investigation based on quantitative data, which was then related to the responses from semi-structured interviews

As for the production and analysis of qualitative data, a voice recording application was used to capture the interviews, and the obtained material was kept confidential. Additionally, the speech of both interviewers and interviewees was submitted to analysis using the Artificial Intelligence software SONIX to transcribe all interviews. This transcription process took five hours and generated 11 to 15 pages of text per interview. Subsequently, the reconstruction of cases (interviews) through the adaptation of Objective Hermeneutics required about one week per interview, totaling eight weeks of analytical work.

The adapted Objective Hermeneutics procedure followed three main steps: (1) an initial, line-by-line reconstruction of each interview segment, focusing on latent meanings and contradictions in students' narratives; (2) the formulation of interpretive hypotheses grounded

in the textual material and in the theoretical framework; and (3) a comparative synthesis across cases, in which recurrent patterns and singularities in students' cognitive and affective experiences were identified. To conduct this process, analytical hypotheses were developed based on the quantitative data and subsequently confirmed or refuted through correlation with the quantitative data collected using the Likert scale. This stage was the most time-consuming, as the analysis of eight interviews—given the aforementioned procedures—required approximately six months.

To ensure interpretive reliability, the analyses were conducted by at least two researchers, who independently coded selected excerpts and then engaged in peer debriefing sessions to discuss and refine interpretations until reaching consensual readings. Particular attention was paid to minimizing cultural bias in interpretation: mixed-country research teams (Brazilian and German researchers) participated in the analytic discussions, and interpretations were systematically checked against contextual information about each higher education system and university culture.

Thus, it can be stated that the objective immanence revealed through the method's structure allowed for a deeper analysis of students' perceptions, unveiling profound layers that were not initially evident. The research results present, discuss and analyses these aspects.

Research Results

The findings are presented according to the three analytical axes: (1) Teaching Mode, (2) Student Learning, and (3) Professor Behavior. For each axis, we first summarize the quantitative patterns from the Likert-scale items, and then present qualitative themes and illustrative quotations from the interviews. Additionally, correlations between the items on the Likert scale were made using the MCA graph.

Teaching Mode

Within the Teaching Mode axis, three items were analyzed: item 3 (“Hybrid teaching, with both in-person and remote activities, seems more efficient to me than strictly in-person teaching”); item 12 (“In a post-pandemic situation, I believe it would be essential for my learning to remain physically present at the university”); item 17 (“My experience with remote teaching showed me that online interaction with professors is not necessary, as recorded classes would be sufficient”).

Quantitative Findings on Teaching Mode

55% of Brazilian students disagreed with the efficiency of hybrid teaching compared to in-person instruction (item 3). German students were more evenly split, with almost half agreeing that hybrid formats could be more efficient than purely face-to-face arrangements. Approximately 95% of Brazilian students disagreed that recorded classes alone sufficed for adequate training (item 17), emphasizing that physical presence was essential while about 65% of German students shared this view. German students also showed somewhat higher

endorsement of maintaining face-to-face classes in the “new normal”, with around 60% totally or partially agreeing with item 12.

Qualitative Findings on Teaching Mode

Qualitative analysis of the interviews revealed two main themes related to teaching mode: (1) In-person presence as a condition for professional formation; and (2) Hybrid flexibility versus loss of interaction in recorded-only formats.

Brazilian students consistently emphasized that recorded classes could never replace relational engagement with professors, even when interactions occurred online. They linked face-to-face presence to the authenticity of pedagogical training and to the possibility of observing, dialoguing, and experimenting in school contexts. For example, one Brazilian student stated: “I honestly think it was like going from water to wine. Everything flows in face-to-face classes. In my view, relationships with professors, relationships with classmates, learning itself, everything changes a lot for me as well”.

German students, in contrast, expressed greater openness to combining in-person and online formats. While they also preferred face-to-face classes, they highlighted the advantages of hybrid teaching, such as convenience, reduced commuting time, and the possibility of revisiting recorded material when needed. As one German student remarked:

This framework proved ideal for my requirements, as it facilitated the subsequent analysis of various Geographic concepts through archived recordings. Furthermore, the option for live streaming provided significant flexibility for real-time engagement. The repository was comprehensive, offering full access to instructional materials and past examinations. Consequently, I achieved a passing grade in all assessments on the first attempt. This modality also enabled virtual site visits that would otherwise have been inaccessible, while allowing for a level of participation in extracurricular events that far exceeded the constraints of traditional formats.

Across the four Brazilian and four German interviews, no substantially new themes emerged regarding teaching mode after the sixth interview, suggesting a reasonable level of thematic saturation for this axis within the scope of the sample.

Student Learning

Within the Student Learning axis, three items were analyzed: item 13 (“In remote teaching, I learned the content more efficiently and consistently”); item 22 (“Remote teaching allowed me to organize my studies more effectively”); item 23 (“During remote teaching, uninterrupted access to links and online information made it difficult for me to concentrate on course activities”).

Quantitative Findings on Student Learning

For the Student Learning axis, quantitative results showed that a majority of Brazilian students (around 80%) and a smaller, but still substantial, proportion of German students (about 56%) disagreed that they learned content more efficiently and consistently during ERT (item 13). Perceptions of improved study organization were lower among Brazilian students (35% agreement with item 22) than among German students (45% agreement). Difficulties concentrating on course activities (item 23) were more frequently reported by Brazilian students, with roughly three quarters agreeing that uninterrupted internet access hindered their focus, compared to about half of German students.

Qualitative findings on Student Learning

Qualitative analysis of the interviews revealed two recurrent themes regarding student learning: (1) Erosion of routines and difficulty sustaining attention; (2) Partial gains in autonomy and study organization.

Brazilian students frequently described feelings of disorganization and overload, reporting that home environments, family responsibilities, and overlapping demands from different courses disrupted their ability to follow synchronous activities and maintain regular study schedules. A Brazilian student illustrated this challenge:

Even in terms of time, because my endurance at a distance was lower than my endurance in person. Online, after two hours we were already tired—mentally tired. My eyes hurt from not being able to focus anymore. And then there were all the distractions, the phone, something else happening at the same time, so the distractions were much greater. In face-to-face classes, I feel I have more resistance, you know.

German students more often highlighted gains in autonomy and flexibility, such as being able to manage their own pace for asynchronous tasks and to adapt their study times to personal circumstances, even while acknowledging distractions and fatigue. A German participant commented:

In fact, I felt better supported in the digital format; using the chat allowed me to formulate more specific questions and removed the discomfort of speaking up in a large hall. Additionally, the structure of weekly deadlines helped me manage my time more effectively, as I could organize my schedule better than I could with the constant demands of preparing for in-person meetings.

Across cases in both countries, reports of difficulty concentrating due to constant online stimuli echoed the survey pattern associating continuous access to internet links with reduced learning effectiveness, while references to self-organization and time management converged with higher agreement rates on the respective items. No new major themes emerged for the learning axis after coding the sixth interview, suggesting a reasonable level of saturation for this dimension.

Professor Behavior

Within the Professor Behavior axis, three items were analyzed: item 1 (“During remote teaching, I paid attention to the content when the professor directed the activities that should be used in the course”); item 4 (“In general, professors were supportive and flexible when I faced problems”); item 15 (“In my opinion, the professors who accepted students’ suggestions and acknowledged their problems were the ones who best conducted remote teaching”).

Quantitative Findings on Professor Behavior

For the Professor Behavior axis, quantitative data indicated that Brazilian students more frequently agreed that professors’ directive guidance helped them pay attention to course content (around 70% agreement with item 1) than German students (about 40%). Perceptions of professors as supportive and flexible in the face of problems (item 4) were also higher among Brazilian students (roughly 80% agreement) than among German students (around 50%). Finally, both groups valued professors who listened to students’ suggestions and acknowledged their difficulties (item 15), with agreement levels around 90% among Brazilian students and 68% among German students.

Qualitative Findings on Professor Behavior

Qualitative findings offered further insight into these patterns and were organized around two main themes: (1) Empathy and emotional support; and (2) Horizontal directivity and shared decision-making.

Brazilian students repeatedly described professors who checked on their well-being, adjusted deadlines, and acknowledged the emotional impact of the pandemic, not only in academic terms but also in relation to family and personal situations. One Brazilian interviewee, for instance, reported:

It felt like a weight being lifted, because the professors explained things to us always very carefully, always saying that for any emotional issue or difficulty or anything like that... even online, we could contact them and it would remain confidential, and they would understand. And I also noticed greater care when they taught the content, because we were the first cohort. (...) We were far away, and we still had to learn things like writing properly, doing assignments, those kinds of things. So there was a really great level of care that I felt overall from all the professors.

German students, in turn, emphasized organizational flexibility and understanding regarding workload and technical difficulties, even when emotional support was more often sought from peers and family members. As one German student indicated:

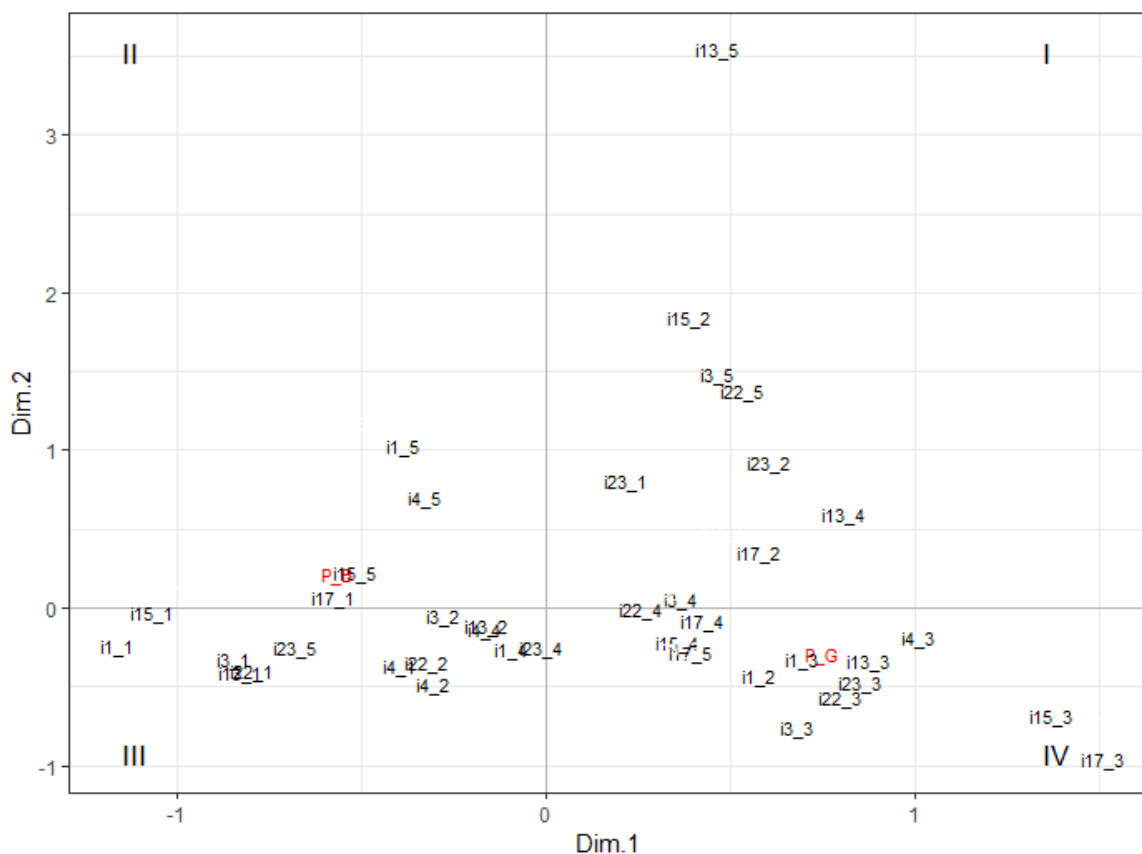
In the summer semester, I had a positive experience in a Chemistry course where the professor held weekly Zoom meetings, fostering a much closer learning environment. We agreed that he would send the PowerPoint slides in advance, featuring recorded commentary on each slide, which allowed our live sessions to be dedicated solely to discussion and Q&A. This approach was highly effective.

Across the eight interviews, these themes appeared consistently whenever professor behavior was discussed, with no substantially new aspects emerging in the last interviews, suggesting thematic saturation for this axis as well.

Graph of Multiple Correspondence Analysis (MCA)

Figure 1

Graph of Multiple Correspondence Analysis



We present the statistical analysis of the items that revealed the greatest correspondence among Pedagogy courses in Germany and Brazil.

The horizontal direction of the x-axis on the chart refers to its positive side and to the Likert scale items i4¹ and i15² (strongly agree) e i17³ (strongly disagree⁴). These correlations stand out because the set of responses is related to German students' perception that flexible and supportive behaviors of professors are aspects directly associated with better management of ERT, considering the acceptance of students' suggestions and issues. Additionally, the exclusive access to recorded classes instead of in-person classes was highlighted as something undesired by the student body.

On the negative side of the x-axis, related to the Brazilian perception of Pedagogy courses, the items i15 and i23⁵ (strongly agree) and i17 (strongly disagree) stood out. Similar to the German students, the Brazilians considered the conduction of ERT activities by professors to

be a decisive factor both for learning the course content and for maintaining focus on studying that content, given the difficulty of concentration during remote activities. Furthermore, Brazilian students also believed that recorded classes could never replace interactions carried out not only in person but also in the virtual environment.

Regarding the vertical direction, visualized on the y-axis of the chart, the response “strongly agree” was associated with items i1⁶, i3⁷ and i22⁸. These items allow for the analysis of both groups of interviews, German and Brazilian. It is observed that, for both groups of students, professor behaviour related to student learning and their preferences of teaching mode was essential for students’ perception of their own ability to organize their studies and formative process. It is also worth emphasizing that hybrid teaching could be utilized upon the return to in-person teaching and learning activities at the university.

In addition to the MCA, a polychoric correlation was performed. It is used to correlate two ordinal categorical variables, here represented by the items on the Likert scale. Therefore, by simultaneously investigating multiple categorical variables, we found association patterns showing weak (0.20 to 0.30), moderate (0.30 to 0.50), strong (0.50 to 0.70), and very strong (above 0.70) correlations:

1. Moderate positive correlation between Likert scale items 3 and 17 (German students): 0.50. A weak correlation was observed among Brazilian students: 0.21.
2. Moderate to strong negative correlations between items 12 and 13 (German students): - 0.57, and a weak negative correlation for these items among Brazilian Pedagogy students: - 0.26.
3. Moderate to strong positive correlations between Likert scale items 13 and 22: 0.70 among German and 0.65 among Brazilian students.
4. Moderate to strong negative correlation between items 13 and 23 for German students: - 0.48; and a strong negative correlation for these items among Brazilian students: - 0.54.

Discussion

Regarding the Teaching Mode axis, both Brazilian and German Pedagogy students prioritized in-person instruction over fully online or recorded-only formats. However, the intensity of this preference differed markedly: 95% of Brazilian students partially or totally agreed on preferring in-person classes, compared to 65% of German students. This discrepancy was evident in interviews. Brazilian students, predominantly female, characterized face-to-face instruction as essential for continuity in their pedagogical training. Among the reasons were concerns about their professional futures (Marinho et al., 2023; Vieira & Charlot, 2023), since practical activities such as internships, essential to pedagogical training, require in-person socialization and cannot be fully replaced by remote methods.

During the pandemic context, the significance of interaction and bonding intensified as central elements in the teaching-learning process, fundamental to professional formation. This was corroborated in interviews with students from both countries, who raised concerns about training quality due to the absence of in-person internships or inadequate organization of online

internships that could meet formative expectations prior to COVID-19 and Emergency Remote Teaching (ERT).

Beyond this, it is necessary to distinguish the forms of communication and interaction involved, not only for content acquisition but also in the socialization processes and identity constructions of professors and students. In face-to-face teaching, a complex interplay of verbal and non-verbal communication occurs, including looks, gestures, and body language, which can reinforce or contradict verbal messages and contribute to symbolic, social, and cultural interactions (Vygotsky, 2007). Such non-verbal communicative elements contribute to deeper understanding and strengthen empathetic and collaborative bonds in educational contexts.

In remote teaching, however, interviews revealed that many Brazilian and German students tended to turn off cameras during synchronous classes, limiting themselves mostly to listening to professors' explanations. Often, they engaged in multitasking, such as completing assignments from other courses, browsing social media, or playing online games with peers. This behavior was considerably more prevalent in remote teaching than in-person. Physical presence does not guarantee concentration. However, multifaceted face-to-face communication fosters deeper engagement, whereas multitasking in virtual settings undermines this process.

Although the majority of students in both countries preferred face-to-face teaching, they also recognized potential benefits in hybrid teaching models (combining in-person and remote learning), especially compared to exclusive reliance on recorded lectures. This quantitative trend in was supported by the following qualitative evidence: for 35% of Brazilian and 40% of German students, some elements of hybrid teaching should be maintained upon return to campus. This openness aligns with prior analyses such as Mali & Lim (2021), who documented positive student perceptions of blended learning following the ERT period.

Among German students, two notable advantages of hybrid teaching emerged from interviews: (1) reduced pressure and demands from professors compared to pre-pandemic face-to-face classes, and (2) financial savings on food and transportation by avoiding campus commutes. This observation highlights how uncritical adoption of recorded-only instruction can diminish pedagogical effectiveness. Brazilian students, in particular, rejected the notion that recorded classes could substitute pre-pandemic physical and online interactions; 95% disagreed, compared to 58% of German students. Strong resistance to loss of interaction, whether physical or virtual, was a salient feature among Brazilian students.

In the Brazilian Pedagogy context, the rejection of a model relying solely on recorded classes without online professor interaction was pronounced. Hence, within the Teaching Mode axis—encompassing face-to-face, hybrid, and recorded formats— students predominantly expressed a preference for face-to-face teaching, while valuing the online interactions that occurred during remote teaching. For German students, hybrid teaching attained greater relevance, though face-to-face remained the preferred modality. Therefore, hybrid approaches combined with recorded lectures can address the educational needs of current student cohorts. This finding was supported quantitatively by a moderate positive polychoric correlation (0.50) in Germany between relevant questionnaire items, whereas in Brazil the correlation was weak (0.21), reflecting stronger resistance to the hybrid plus recorded model there.

Thus, face-to-face contact between professors and students proved the mode best aligned with formative expectations. Recorded lectures were more accepted in Germany than in Brazil,

yet even German students preferred continuous direct interaction with professors over recorded content within the “new normal” post-pandemic university setting.

Regarding the Student Learning axis, the majority of Brazilian (80%) and German (56%) students totally or partially disagreed with the notion that interactions during ERT adequately shaped efficient content learning. In other words, many expressed dissatisfaction with the consistency and effectiveness of their learning throughout social confinement. These quantitative results are qualitatively related to the challenges and difficulties in mastering digital information and communication technologies (DICTs), and the fact that synchronous and asynchronous classes were held in distraction-prone environments such as students’ homes, where family interruptions were frequent. Supporting this interpretation, interviewees described professors’ efforts to address diverse challenges related to remote teaching—operational, cognitive, technical, behavioral, psychological, and beyond. Thus, general dissatisfaction with learning outcomes can be attributed to limitations inherent not only to remote modalities but also to face-to-face contexts constrained by pandemic circumstances. On study organization, 35% of Brazilian and 45% of German students partially or totally agreed that remote teaching enabled improved self-organization. The lower Brazilian figure aligns with the emphasis on continuous, meaningful face-to-face interactions in Brazilian Pedagogy programs. The absence of such direct contact was perceived as hindering students’ ability to organize their studies effectively.

Notably, German students expressed stronger confidence in exercising autonomy vis-à-vis professors, as reflected in interviews. One German student remarked feeling comfortable submitting asynchronous assignments without the pressure typical of pre-pandemic face-to-face classes. This suggests that German students experienced unprecedented changes in their relationships with course content and assessment planning due to remote teaching during lockdowns. These shifts in teacher-student dynamics will be further examined under the professor behavior axis.

Another fundamental element connected to study organization is sustaining students’ attention during remote teaching. Regarding whether uninterrupted internet access made concentration difficult during synchronous classes, 75% of Brazilian and 50% of German students partially or totally agreed. On a related item concerning professor behavior, 70% of Brazilian and 40% of German students partially or fully agreed that more directive teaching (regarding synchronous and asynchronous activities) led to better student attention. Following this line of reasoning, the qualitative analysis of the percentages described above demonstrated that the interplay between widespread access to distracting online content and the professor’s central role in directing focus highlights a key challenge: maintaining deep attention amid omnipresent multitasking and a flood of audiovisual stimuli during social confinement in both nations. The predominance of hyper-attention over deep attention has educational consequences. Hyper-attention — defined by a preference for high levels of sensory stimulation and rapid task switching — may explain multitasking behavior among youth, as suggested by Hayles (2007). For instance, while washing dishes and listening to music can co-occur, writing a text while listening to energetic music impairs focused cognitive engagement with the task, as deep attention is disrupted by competing stimuli (Türcke, 2016).

Quantitative data analysis revealed strong positive associations between items related to time management and professor directivity for both Brazilian and German students (0.65 and

0.70, respectively), underscoring the acknowledged role of structured time management and teacher guidance in promoting learning. On the other hand, moderate negative correlations (-0.54 in Brazil and -0.48 in Germany) between constant internet link access and focused learning indicate that distractions compromised learning efficiency. Students commonly expressed difficulty concentrating on course activities due to the easy availability of numerous internet links during remote learning, a sentiment echoed in interviews.

These findings align with other recent cross-continental studies (Rahman et al., 2023), which identified student engagement as a pivotal mediator between online teaching and academic success in the pandemic context. These studies also highlighted professors' and students' unpreparedness for the abrupt transition to online instruction, confronting obstacles such as lack of technical devices, limited internet access, and restricted social interaction (Rahman et al., 2023).

Nonetheless, many difficulties were eased by professors' interaction quality during lockdown and ERT. When analyzing the data from the axis: Teacher Behavior, our research indicated that 80% of Brazilian students positively viewed professors' solidarity and flexibility throughout the pandemic. This likely contributed to the overwhelming 95% support for returning to in-person university activities. There was hope that the flexibility, solidarity, and empathy previously demonstrated would continue in face-to-face interactions post-pandemic, potentially smoothing the readaptation process.

Brazilian interview data shed light on how flexibility and solidarity materialized: through explicit expressions of care and concern, such as inquiries about students' wellbeing and family situations ("How are you coping?", "How is your family?", "Can I help?"). These inquiries transformed institutional flexibility into genuine empathy among educational agents. Moreover, interviewees linked professors' flexibility to operational accommodations, e.g., postponing deadlines to alleviate accumulated workloads.

Among German students, 50% agreed their professors were flexible and supportive. Behavioral characteristics highlighted in interviews included professors' understanding that students needed extended time to complete tasks and appreciation for professors' efforts to surmount their own technical challenges in DICT use (e.g., Zoom).

A qualitative analysis of the quantitative data presented above could be as following: a notable cultural contrast emerged: a German student acknowledged that professors primarily addressed cognitive difficulties in the teaching process during ERT, while emotional support was sought among friends and family. This underscores a clearer separation between professional and affective dimensions in the German educational context, a division less pronounced in Brazil, where professors often engaged in personal inquiries during the pandemic's exceptional circumstances.

Overall, the study reveals that despite cultural differences and pandemic-related challenges, students in both Brazil and Germany recognize face-to-face instruction and direct professor involvement as critical to effective learning and formation. Hybrid teaching may enhance flexibility and promote technological advances, but cannot substitute the interpersonal interaction that sustains pedagogical bonds and fosters deep learning. Additionally, student engagement and professors' empathetic behavior stand out as essential factors ensuring educational success, especially in times of crisis such as the COVID-19 pandemic.

Conclusion

The analysis of data collected from questionnaires and interviews with Brazilian and German Pedagogy students revealed both significant cultural differences and striking similarities regarding professor-student relationships during Emergency Remote Teaching (ERT). These findings provide valuable insights for reshaping educational interactions in the post-pandemic context.

Cultural Differences in Perceptions of Faculty Flexibility and Support

In Germany, the professor's role is predominantly associated with cognitive and academic domains. German students perceive instances of affectivity and emotional support as belonging to more intimate and personal relationships—those established within contexts involving friends, partners, and family members. Within the educational space, professors are seen as flexible and supportive insofar as they optimize conditions for knowledge acquisition and content delivery. Defining their role strictly within these academic boundaries allows students to engage effectively with course materials in a collective setting, without expecting emotional involvement beyond the learning process.

Conversely, Brazilian students attributed flexibility and support to professors not only for accommodating academic demands—such as extending deadlines and adapting teaching methods to ERT—but also for their explicit concern with the emotional well-being of students and their families. Interview data evidenced that Brazilian students considered their professors fundamental agents in content learning and crucial in alleviating the psychological suffering triggered by prolonged social confinement and pandemic hardships. Professors in Brazil, therefore, functioned in a more holistic role that blended cognitive and affective support. This holistic orientation distinguishes the Brazilian context and sets the stage for understanding the broader cross-cultural convergences that emerged

Cross-Cultural Convergences: The Centrality of Interaction

Despite these cultural distinctions, important convergences emerged. Professors who limited their engagement to cognitive demands nonetheless fostered a degree of emotional closeness between faculty and students, even when physically distant. This affective proximity reflected strongly in questionnaire responses: 90% of Brazilian students and 68% of German students agreed that the best professors were those who listened to and welcomed students' ideas and needs.

The COVID-19 pandemic prompted an intensified form of relational proximity between professors and students as educational agents confined at home and spatially separated. They were compelled to forge connections not only cognitively and technically but also affectively.

The Emergence of Horizontal Directivity

A new behavioural pattern emerged among professors in both countries - a horizontal directivity (Zuin & Mello, 2024). This model blends traditional content delivery with a dialogical approach in which professors guide rather than dictate. While professors retained responsibility for transmitting researched content, the relationship unfolded not in a purely vertical hierarchy but horizontally, with students actively seeking information - primarily via digital resources - and collaboratively constructing knowledge alongside faculty. This interplay permitted a more egalitarian, co-constructive educational experience that acknowledged uncertainties regarding professional futures and addressed emotional states such as indifference, apathy, or anxiety.

Recommendations for Educational Policies

Based on the analysis, eight key propositions are advanced to inform public educational policies, especially in emergency scenarios:

1. Face-to-Face Instruction as Essential: The data consistently indicated that synchronous, in-person interaction remains central to effective pedagogical outcomes and student well-being. Policy frameworks may prioritize in-person modalities while strategically integrating technology.
2. Sustainable Technological Integration: Digital tools employed during remote instruction (e.g., Google Classroom, Meet, Zoom, Teams) can and should continue to complement face-to-face education by enhancing teaching and learning processes.
3. Digital Attention Management: Given the documented difficulties in sustaining concentration caused by uninterrupted internet access and multitasking, strategies focusing on horizontal directivity must be implemented to mitigate distraction and promote equitable learning environments.
4. Prioritization of Synchronous Interactions: Although recorded classes provide important resources, real-time interactions between professors and students have demonstrated superior outcomes in learning effectiveness, psychological well-being, and fostering critical digital citizenship.
5. Cultivation of Faculty Empathy: Teachers' flexible, supportive, and empathetic attitudes markedly contributed to student learning and mental health during the pandemic; such pedagogical dispositions merit institutionalization as professional standards.
6. Continuity of Horizontal Directivity: The dialogical, non-hierarchical interaction modes developed during ERT must be preserved and deepened in post-pandemic face-to-face contexts, shaping the so-called "new normal"
7. Institutional Infrastructure: Policies must ensure rapid institutional response times and provide equitable access to techno-digital equipment across the academic community to minimize disparities.
8. Comprehensive Support: Adequate working and studying conditions, as well as psychological support mechanisms, should be guaranteed to sustain the academic community's overall well-being.

Prospective Reflections: Redesigning the “New Normal” Between Teachers and Students

The quality of professor-student interactions emerged as a decisive factor not only in alleviating the psychological repercussions of social confinement but also in strengthening substantive learning. This insight is fundamental for framing educational policies both during pandemic emergencies and in the post-pandemic era.

While the study confirmed a strong preference for face-to-face instruction over virtual modalities, it also emphasized that mere availability of recorded lectures is insufficient. What truly matters - and what differentiates meaningful learning experiences - is the quality and depth of interpersonal interactions with professors. This finding is confirmed by the online interactions established between Roma mothers during the pandemic confinement. Given the difficulties encountered by schools and the public authorities in offering conditions for continuing their children's studies, Roma women organized themselves virtually to receive academic support through the social network WhatsApp (Aiello et al., 2022).

Paradoxically, ERT experiences may have catalyzed recognition of how synchronous, dialogical interactions - combining both cognitive and affective dimensions - enhance pedagogical effectiveness. This model of 'horizontal directivity' merits further investigation and potential institutionalization. These findings suggest potential reconfiguration of university environments toward by integrating technological resources with the primacy of empathetic, dialogical educational relationships. This study contributes novel understanding of how pedagogical relationships—combining cognitive and affective dimensions—shape post-pandemic educational effectiveness in cross-cultural contexts. In fact, after highlighting the main insights and their consequent practical implications, it is important to point out a limitation of this article that could prompt future research. Indeed, our research focused on the three axes in relation to the perceptions of Pedagogy students. But would Brazilian and German students of Science, Technology, Engineering and Math (STEM) react similarly to their Pedagogy colleagues? Even in the context of the end of lockdown, research could be conducted investigating the three axes in relation to this sample of students, especially given the current trend of hybridizing teaching in school environments.

The virtual interactions developed during ERT have generated effects that can nurture this transformed educational landscape - embodying more relational and supportive connections within traditional face-to-face teaching. Thus, redesigning educational relationships in the post-pandemic era is not merely about adapting to extraordinary circumstances; it is an opportunity for sustained transformation rooted in recognizing human interaction's central role in effective pedagogy.

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Notes

¹ “In general, professors were supportive and flexible when I faced problems during remote teaching”.

² “In my opinion, the professors who accepted students’ suggestions and acknowledged their problems were the ones who best conducted remote teaching”.

³ “My experience with remote teaching showed me that online interaction with professors is not necessary, as recorded classes would be sufficient”.

⁴ Of the 9 items related to the teacher-student axis, 7 items were selected relating to strong agreement and strong disagreement.

⁵ “During remote teaching, uninterrupted access to links and online information made it difficult for me to concentrate on course activities”.

⁶ “During remote teaching, I paid attention to the content when the professor directed the activities that should be used in the course”.

⁷ “Hybrid teaching, with both in-person and remote activities, seems more efficient to me than strictly in-person teaching”.

⁸ “Remote teaching allowed me to organize my studies more effectively”.

Author Contributions

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