



Original Research

# Internal Medicine Resident Perspectives on Format of Didactics during the COVID-19 Pandemic

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## Abstract

**Background:** The COVID-19 pandemic necessitated the virtualization of medical education. While there is increasing guidance available on the various methods and strategies for this online pivoting, there is limited data about the learners' perspective. The easing of social distancing restrictions has necessitated innovative delivery of education in hybrid formats (a mix of in-person and virtual). **Methods:** An anonymous voluntary survey was distributed to all internal medicine (IM) residents at an academic medical center assessing resident perspectives on the transition from in-person didactics (IPD) prior to March 2020 to virtual didactics (VD) prompted by COVID-19 related limitations from March 2020-June 2022. This was followed by an evolution to a hybrid format didactics (HD) in July 2022 after social distancing guidelines were lifted. In January 2023, a follow-up survey was distributed to all IM residents to assess perspectives of VD as compared to HD. The surveys assessed trainee impact on education, quality of content and interaction with the speaker, use of interactive tools, content accessibility, technical difficulties, and comparison to prior formats (IPD). **Results:** 45 PGY-1s (interns) and PGY2-4s (senior residents) responded to the June 2021 survey (comparing IPD and VD; 30.8% response rate) and 30 interns and senior residents responded to the January 2023 survey (comparing HD to both previous formats; 18.3% response rate). Most interns were dissatisfied with the quality of educational content, with only 35% (9 out of 26) rating it as high or very high quality in 2021, and a similar rating in the January 2023 survey (7 out of 20). Interns also reported subpar interaction with speakers, with 19% (5 out of 26) rating it as high or very high quality in 2021, and 35% (7 out of 20) in 2023. Senior residents had similar views on content quality, with 45% (8 out of 18) giving it a high or very high rating in 2021, and a lower rating of 20% (2 out of 10) in 2023. They also reported suboptimal speaker interaction, with 28% (5 out of 18) in 2021 and 20% (2 out of 10) in 2023 rating it as high or very high quality. Despite the ease of use and accessibility of digital platforms, with over 70% of both interns and senior residents in both 2021 and 2023 surveys expressing satisfaction, a notable 54% (14 out of 26) of interns indicated an interest in returning to in-person didactics post-pandemic, compared to 25% (4 out of 16) of senior residents. **Conclusions:** Our single center study demonstrated dissatisfaction in IM residents across various domains of virtual as well as hybrid format didactics despite reported ease of access. As innovations in delivery of resident education continue to occur, an ongoing assessment of the impact on learner satisfaction and knowledge acquisition is advised to ensure effective delivery.

## BACKGROUND

A key component of a successful residency program is a comprehensive didactic educational curriculum. All internal medicine (IM) residency programs must provide a structured, recurring didactic program based on core internal medicine competencies, as directed by the Accred-

itation Council for Graduate Medical Education.<sup>1</sup> Many IM residency programs utilize one hour during the noon hour to deliver this didactic curriculum to residents, which is referred to as "noon-conference" and serves as primary delivery of didactic education. For reference, our residency program provides residents with approximately 207 hours of didactic instruction each year.

The delivery of education pivoted to a virtual format during the COVID-19 pandemic.<sup>2,3</sup> A significant proportion of the literature during this time focused on the practical aspects of virtualization of education.<sup>4</sup> In a study of 268 medical students, 54% of the first-year and 24% of the second-year students reported a negative effect on the quality of instruction. Still, most students (64%) preferred the flexibility of videocasted lectures.<sup>5</sup> Learner perspectives of this virtual pivot in education during the COVID-19 pandemic have similarly been described in a few groups of IM trainees. However, perspectives have been studied in other subsets of trainees, including several surgical and pediatrics programs.<sup>6-15</sup>

As our institution has navigated the COVID-19 pandemic, we have shifted to a blended or hybrid format of resident didactics that combines in-person and virtual learning since the relaxation of social distancing recommendations. A review of the existing literature suggests that a hybrid or blended format of trainee education is a reasonable alternative to traditional (in-person) lectures during medical training.<sup>16-19</sup> Small sample sizes limit an understanding of the perspectives of medical residents vis-à-vis hybrid learning but have shown favorable results, with most citing additional benefits over the traditional lecture style, including increased flexibility, less travel time, and ease of access.<sup>16,20-22</sup> Prior studies that evaluated multi-specialty resident perspectives on medical education, as well as studies in surgical trainees, have found that the majority of residents favored in-person interactive sessions for small-group meetings compared to a virtual format for large regional and national conferences. In contrast, most residents preferred a virtual format for traditional didactics, M&M, tumor board, and board review sessions, though suggested a hybrid format should remain an option in the future.<sup>14,17</sup>

There is a paucity of literature describing the perspectives of IM residents on the virtualization of medical education and the transition to a hybrid format of medical didactics. We sought to evaluate the impact of virtualization of the existing structured didactics compared to a hybrid format (virtual and in-person) on IM residents at our university-based program. The objective was to understand the perspectives of IM trainees to provide a voice to those most affected by this shift in the medical education landscape.

## METHODS

This study was exempted from review by the Institutional Review Board at our institution. An anonymous, voluntary, self-administered survey was disseminated to 74 interns and 72 senior residents via institutional email at our university-based program in June 2021. The survey was open for 1 month, after which it closed. The survey questions were framed to assess interns' perspectives specifically on virtual didactics (VD) only, as they had

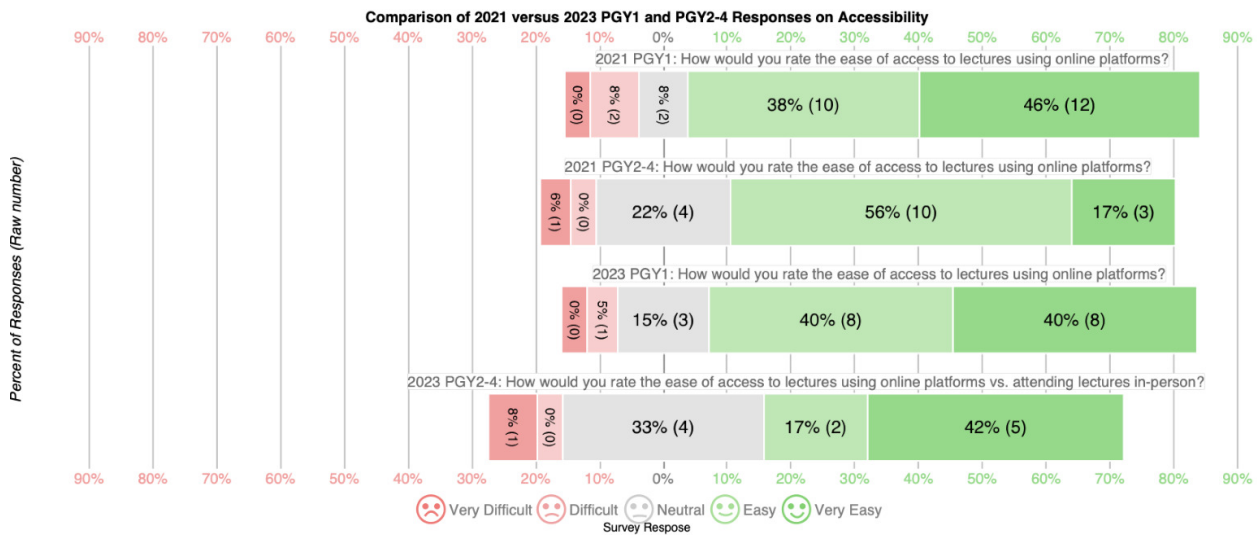
no experience with in-person didactics (IPD) during residency. The survey provided to senior residents included questions that explored their perspectives on VD compared to IPD in a five-option, Likert scale format. The questions addressed intern and resident perception of the disruptiveness of the pandemic on resident education, quality of virtual lectures, presence or absence of logistical difficulties, and evaluation of interactions with the speaker.

At our institution, all structured didactics (resident noon report, noon didactics, morbidity, and mortality conferences (M&M), grand rounds, and journal clubs) were transitioned to virtual platforms utilizing Zoom (Zoom Video Communications, San Jose, CA) during the COVID-19 pandemic. Early in the pandemic, residents participated online from their personal electronic devices at home or the institution in a socially distanced manner.

In January 2023, two years into the COVID-19 pandemic, a follow-up survey was emailed to 84 interns and 80 senior residents. Similar to the earlier survey, the questions assessed intern and senior resident perspectives on VD compared to hybrid didactics (HD). Like the earlier survey, this survey was accessible for one month. Currently, at our institution, all structured didactics are in a hybrid format, which combines in-person and virtual learning, with most interns and residents present in-person and presenters teaching in-person or virtually. Select interns and residents are offered the option of participating online from a remote location if off-campus; the remainder are in a large conference room, participating in the virtual conference facilitated by a chief resident. All of the lectures were recorded and kept online, providing the ability to watch them at a future time if desired.

## RESULTS

In the initial June 2021 survey, out of 146 interns and residents who received the invitation to participate, 45 responded (30.8% response rate). In the initial survey of interns in June of 2021 (**Table 1 - Appendix**), only 8% of interns felt that the pandemic did not significantly disrupt their education, while only 23% felt satisfied or very satisfied with didactics delivered over online platforms. Most of the interns (85%) found the online lectures easy or very easy to access, while 12% reported experiencing technical difficulties that prevented engagement (**Figure 1**). A majority of the interns (73%) rated the quality of the content and the interaction with the speakers as high (35%) or very high quality (38%). When assessing engagement during online lectures, out of the 26 interns, 8% reported that speakers utilized polls, 23% reported having their camera turned on, 35% had employed the chat functionality, and 19% had engaged using other functions most of the time (such as raising hands or utilizing the question-and-answer feature). Of all respon-



**Figure 1.** Comparison of 2021 versus 2023 PGY1 and PGY2-4 Responses on Accessibility

dents, 54% of the interns expressed wanting to continue with online didactics in the future.

In the same survey administered to 18 senior residents in June 2021 (**Table 1 - Appendix**), only 11% felt that the pandemic did not significantly disrupt their education, and 24% (out of 17 due to the unavailability of one response) felt satisfied or very satisfied with didactics delivered over online platforms (**Figure 2**). Like the interns, most senior residents (72%) found the online lectures easy to access, and none reported experiencing significant technical difficulties. Most senior residents (72%) rated the quality of the content and the interaction with the speakers as high (44%) or very high in quality (28%) respectively. Poor engagement with the speaker was again noted, with only about 17% reporting poll or chat use most of the time and even worse engagement (6%) utilizing other functions. About 17% reported having their camera turned on most of the time. Only 24% of these senior residents expressed wanting to continue with online didactics in the future.

In the January 2023 survey, of the 164 trainees who received the invitation to participate, 30 trainees responded (18.3% response rate). In the survey administered to interns in January 2023 (**Table 2 - Appendix**), 55% felt that the pandemic did not significantly disrupt their education, while 45% felt either satisfied or very satisfied with the quality of online education. A common theme emerged that most of the interns (80%) reported high accessibility of the online lectures during the HD, 85% reported few technical difficulties, while 15% reported never having technical problems. Only approximately a third (35%) of interns rated both the quality of the content and interaction with the speakers as high or very high quality. However, 50% of interns felt that the content of the virtual lectures was low or very low quality, while 15% reported feeling neutral on this question (**Figure 3**). The 2023 survey also revealed poor interaction

with the speaker was a common theme, with about one-third (35%) of interns reporting the quality of interaction with the speaker as low or very low quality, with another 30% of interns neutral in their response. Less than one-third of interns reported interacting with the speaker via polls (20%), utilizing the chat function (15%), or utilizing other functions of virtual engagement (15%), such as raising hands or using the question-and-answer feature. Approximately 30% of interns reported having their cameras turned on for the majority of the lecture.

In the survey disseminated to senior residents in January 2023 (**Table 2 - Appendix**), out of the ten senior residents, only 20% felt that their education was not significantly disrupted, while 30% felt satisfied or very satisfied with didactics in an online platform as compared to traditional in-person didactics (**Table 3 - Appendix**). While most senior residents appeared dissatisfied with HD, the majority (70%) felt that the online lectures were highly accessible compared to traditional in-person didactics. Only 10% reported experiencing significant technical difficulties. Similar to the interns, only twenty percent of senior residents rated the quality of content and interaction with the speaker as high or very high quality compared to traditional in-person didactics.

The senior residents reported a recurring theme of poor engagement with the speaker during the online lectures. Approximately 10% of senior residents reported having cameras on, and none reported frequent utilization of polls or other methods of virtual engagement (such as raising hands or question-and-answer features).

## DISCUSSION

Most trainees expressed dissatisfaction with the virtualization of education in terms of the quality of the content and engagement with faculty in both the VD and the HD formats despite the overall reported ease of use of

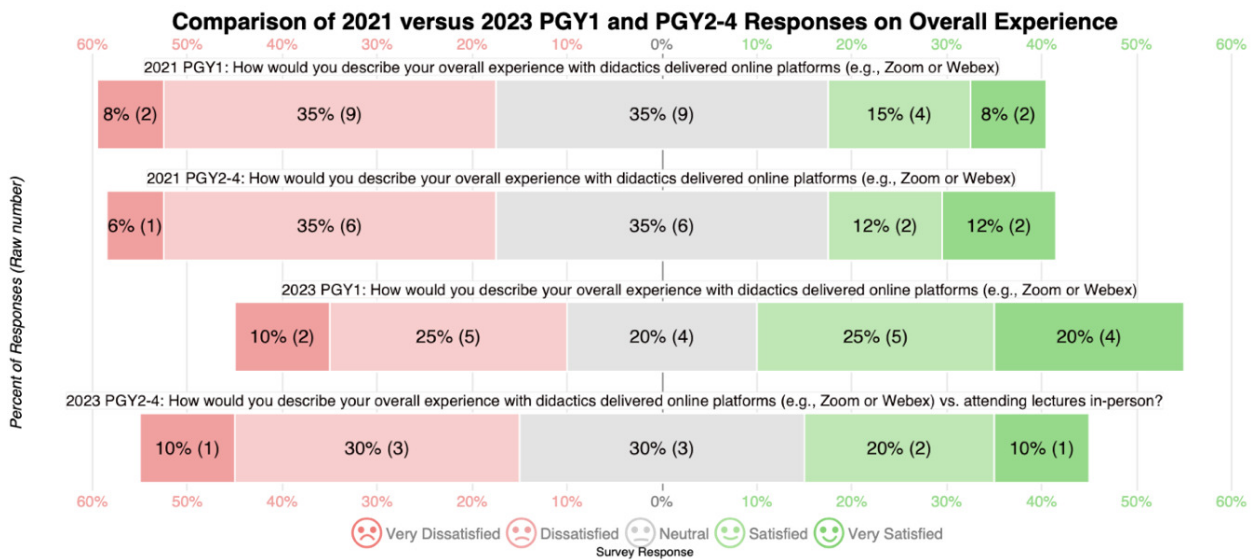


Figure 2. Comparison of 2021 versus 2023 PGY1 and PGY2-4 Responses on Overall Experience

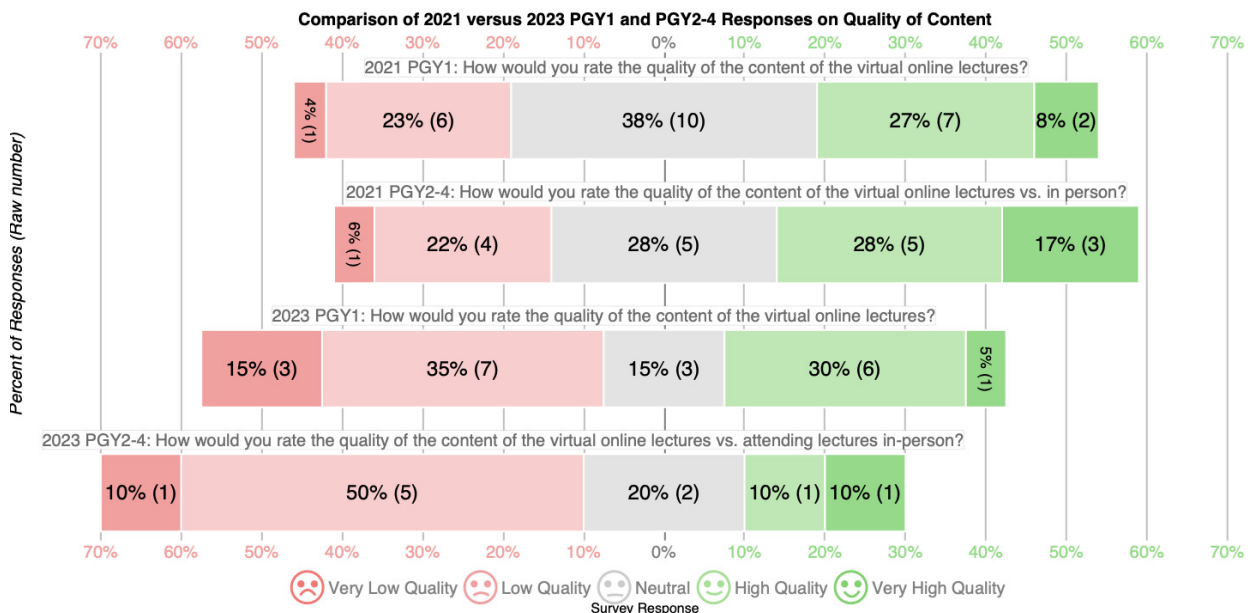


Figure 3. Comparison of 2021 versus 2023 PGY1 and PGY2-4 Responses on Quality of Content

digital platforms. Nearly half (54%) of the interns in the 2021 survey reported an interest in transitioning to in-person learning post-pandemic, while only 25% of the senior residents favored continuation of virtual didactics. Our study findings show that the COVID-19 pandemic has clearly impacted trainee education and is potentially unfavorable. Similar studies in surgical trainees showed comparable results, with residents having a clear preference for in-person versus virtual education, though in the future, recommended learning in a hybrid format.<sup>17</sup> In a multi-center study of IM trainees, trainees also preferred the integration of virtual didactics in the future; however, the delivery and content must be carefully curated to ensure trainee engagement and promote learning.<sup>12</sup> In the 2021 survey, the interns preferred to continue education

in a virtual format, whereas the senior residents did not. We postulate that the ease of attendance in the VD or HD formats was a key driver for interns' desire to continue virtually, with the senior residents likely finding it more challenging to attend IPD due to their evolved work schedules. Additionally, interns may have had prior exposure to virtual education in medical school, thus allowing for a smoother transition in residency, whereas the senior residents in 2021 experienced an abrupt change in the format of didactics during residency, allowing less time for them to adapt to this new learning style.

Limited participant engagement and interaction with the speaker in VD and HD formats was a recurring theme among the survey responses. While some studies, such as Albert et al., have suggested that using chat boxes and



polls allows for increased user-speaker interaction, we found the adoption of engagement modalities virtually to be limited. Despite providing various modes for increasing interaction (breakout rooms, polls, chat), the transition to virtual learning leads to a loss of camaraderie and less overall interaction. We hypothesize that this dissociation is possibly due to distractions among participants; however, the cause of this lack of engagement needs to be further studied.<sup>12,13</sup>

The prolonged challenges brought about by the COVID-19 pandemic have disrupted many facets of healthcare, mainly resident graduate medical education, and it is now transparent that the initially unplanned but necessary transition from traditional IPD to VD or HD formats will likely persist for the long term. As we adjust to the post-pandemic landscape, we must remain innovative in our delivery of resident education, focusing on continual assessment of the impact on trainees. Further studies on the effects of various aspects of learning, such as knowledge acquisition, translation, and skills acquisition, are imperative to ensure opportunities for appropriate implementation of these changes are not missed.

Our study has limitations. There was a lower response rate during the follow-up survey in 2023, which likely introduced response bias. Therefore, we opted not to conduct inter-group statistical analysis and instead employed a descriptive methodology to present our findings, which revealed a generally low level of satisfaction with virtual education. Additionally, our survey was conducted at a single institution focused only on IM resident trainees, which may limit generalizability. However, our findings apply to multiple specialties when planning how best to develop innovative strategies for delivering graduate medical education in the future. Regardless of specialty, most trainees in residency engaged in similar learning environments during medical school, so the results from one group of resident trainees may be extrapolated and applied to most learners' feelings toward one particular learning style. In the post-COVID-19 response survey, trainees were not assessed on their preferences for continuing with virtual didactics in the future, which limits comparison with the early COVID-19 pandemic responses. In the future, studies delineating which specific areas of resident education (i.e., noon didactics, M&M conference) are best suited for VD or HD formats versus IPD (i.e., simulation training, interactive lectures) as well as faculty assessment of the transition to a virtual or hybrid learning platform would be beneficial. Finally, providing resources and training to educators to adapt and

excel in this changing education landscape will require deliberate institutional and program efforts.

In conclusion, the Covid-19 pandemic required a pivot in educational format and delivery. Our single-center study demonstrated dissatisfaction in IM residents across various domains of virtual and hybrid format didactics despite reported ease of access. In the present and going forward, it is imperative that we persist in researching the effects of these diverse learning styles in order to enhance the medical education experience for our trainees.

### Author Contributions

All authors have reviewed the final manuscript prior to submission. All the authors have contributed significantly to the manuscript, per the International Committee of Medical Journal Editors criteria of authorship.

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

### Disclosures/Conflicts of Interest

The authors have no conflicts of interest to disclose.

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## **SUPPLEMENTARY MATERIALS**

### Appendix

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