



Article

High-Impact Teaching Practices in Higher Education: Understanding Barriers, Concerns, and Obstacles to Their Adoption

Kristin VanWyngaarden ¹, Julie A. Pelton ^{2,*}, Pamela Martínez Oquendo ³ and Christopher Moore ⁴

¹ Department of Educational Leadership, University of Nebraska at Omaha, Omaha, NE 68182, USA; kvanwyngaarden@unomaha.edu

² Department of Sociology & Anthropology, University of Nebraska at Omaha, Omaha, NE 68182, USA

³ School of Natural Resources, University of Nebraska-Lincoln, Lincoln, NE 68588, USA;

pmartinezoquendo@mdot.maryland.gov

⁴ Department of Physics, University of Nebraska at Omaha, Omaha, NE 68182, USA; jcmoore@unomaha.edu

* Correspondence: jpelton@unomaha.edu

Abstract: This research explores the barriers, concerns, and obstacles undergraduate STEM educators face when implementing high-impact teaching practices (HIPs), the application of which may improve student learning outcomes. Because our study took place during the COVID-19 pandemic, our results also shed light on the unique challenges of utilizing HIPs in asynchronous online-learning environments. Thirteen undergraduate instructors were interviewed about their current teaching practices in order to identify barriers to or support for adopting HIPs. Data collected through semi-structured interviews revealed administrative and financial restraints as barriers to effective teaching which have been found in previous research. A number of new and unique obstacles emerged out of teaching remotely or online during the pandemic, including a heightened concern over the instructor's ability to connect with students and engage in the best teaching practices. This research extends our current understanding of barriers and concerns about adopting HIPs in undergraduate STEM courses because of the unique perceived threats that emerged during the pandemic. We identify strategies to equip faculty with the support they need to provide equitable learning experiences, including access to consultants who support curriculum development and implementation in the classroom, ongoing educational coaching, and increased access to professional-development opportunities and a community of inquiry to discuss teaching strategies.

Keywords: high-impact teaching practices; STEM; instructors; undergraduates; higher education; qualitative



Citation: VanWyngaarden, K.; Pelton, J.A.; Oquendo, P.M.; Moore, C. High-Impact Teaching Practices in Higher Education: Understanding Barriers, Concerns, and Obstacles to Their Adoption. *Trends High. Educ.* **2024**, *3*, 105–121. <https://doi.org/10.3390/higheredu3010006>

Academic Editor: Heather Kanuka

Received: 3 August 2023

Revised: 19 December 2023

Accepted: 19 January 2024

Published: 25 January 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

High-impact teaching practices (HIPs) have been established as effective pedagogical practices and are recognized as a mechanism to improve student learning [1–3]. For example, HIPs cause higher-order learning, which allows students to develop a deeper knowledge [4,5] by critically engaging with content by understanding and applying concepts outside of the classroom setting [6,7]. While the use of HIPs is a well-documented evidence-based practice that benefits students, instructors rarely implement HIPs within their courses [8,9]. As a result, instructors rarely prepare students for the challenges of the workforce [10–13]. This dilemma has negatively impacted college graduates' ability to employ essential skills in the workplace, such as critical thinking and problem-solving skills [14].

Why do not more instructors adopt HIPs if they support student learning outcomes [1–3]? Researchers have been trying to understand what influences an instructor's adoption and utilization of high-quality teaching practices for some three decades [15,16]. Past

research has identified individual-level perceptions or concerns and institutional-level barriers to their adoption [9–11]. Because this research sees instructors as embedded within institutions, it has focused on the role of higher education institutions (HEIs) in promoting or inhibiting the adoption of HIPs by instructors [11,15,17]. However, the decision to improve teaching practice may also be influenced by factors outside of the control of HEIs and their support of HIPs.

We add to the current research on the adoption of HIPs by discussing the role of factors outside the control of individuals and institutions, which we label as “obstacles” in a new framework for understanding the decision to make changes to instruction. This research examines the personal/individual, institutional, and exigent factors that affect the adoption of HIPs in math, science, and social science general education courses at our university. Specifically, we ask: “What faculty-perceived concerns, barriers, and obstacles exist with respect to the adoption of HIPs?” Our work, which took place during the forced transition to asynchronous online or remote learning during the COVID-19 pandemic, revealed previously unidentified factors that impede the adoption of evidence-based teaching practices. Results from our interviews illustrate the need to understand larger obstacles to adopting HIPs—such as national or global trends that effect higher education or the socio-political and cultural context—at a macro-level in addition to the individual and institutional level.

2. Literature Review

There are two major threads in the literature regarding instructional change and factors which encourage or discourage the development of the instructor’s quality teaching. The first thread defines these factors as barriers, while the second defines them as concerns. We utilize both perspectives in our study of factors that affect adoption of HIPs, though neither body of work is specific to HIPs. The relevant literature presented in this section will discuss both barriers and concerns; however, it is important to note that our study was grounded in the Concerns-Based Adoption Model (CBAM), a theoretical model that examines instructional change [18]. CBAM “is concerned with measuring, describing, and explaining the process of change experienced by teachers involved in attempts to implement new curriculum materials and instructional practices” [19]. Decades of research using this model has demonstrated that change within educational institutions is an incredibly complex and personal process because it relies on individuals to adopt and subsequently implement a new approach to teaching [18]. Because individuals involved in accomplishing a change to their teaching have different feelings, perceptions, and experiences throughout the change process, a sizable portion of this research has focused on instructors and their concerns.

2.1. Concerns and Teacher Change

We take our concept of “concern” from the Stages of Concern Framework within the concerns-based model. Concerns refer to the feelings, perceptions, worries, or motivations, etc., that an instructor has about a particular change in curriculum, instructional process, or other organizational change [18]. Initially, the stages of concern were conceptualized as a developmental progression through three phases (with concerns varying as one moved from pre-teaching to early career and into late-career teaching) [19]. The framework now sees movement through stages as a possible but not probable progression [19].

There are three main types of concerns: self, task, and impact. Instructors with “self” concerns are focused on how the adoption of a new teaching practice will impact them personally (e.g., confidence in the ability to implement). Conversely, instructors who are concerned with “task” are more focused on the logistics of adopting and executing the pedagogical practice (e.g., the time it will take to implement and resources needed). The final stage in this progression would then be “impact”, where instructors are concerned about how the teaching practice impacts students’ learning outcomes (e.g., measuring benefits of new teaching practice, collaborating with others to diffuse innovation). Further

research identified a fourth category, resulting in the conceptualization of the “unconcerned” category. Instructors who are categorized as unconcerned do not know about or are not engaging with any potential changes to their teaching.

Concerns (or lack of concerns) are often seen as personal or individual factors within the control of individuals. They may prevent individuals from making improvements or engaging in change, and they can be a factor in decisions to abandon a new teaching practice. Understanding individual teacher concerns can help department or university administrators understand what kind of support to provide in order to alleviate specific self, task, or impact concerns. For example, instructors with self-based concerns about adopting HIPs may benefit from formal training and preparation in high-impact instructional practices in order to increase instructor confidence in implementing HIPs [11,20,21]. Findings from Jackson et al. [22] show that implementing long-term faculty-development programs can encourage instructors to use active learning activities in their courses. Training instructors on how to use technology is also essential for supporting the application of evidence-based teaching practices in the classroom, especially for those who struggle to navigate 21st-century technological advances [23–26]. Thus, there is a need to support the professional-development opportunities available for instructors to learn how to implement technology in their teaching.

Some studies have shown that efforts to increase instructor motivation or cultivate an inherent desire to modify their current teaching practices (e.g., lecture) may impact those who hold self, task, or impact concerns but not those who are unconcerned [11,27]. Ultimately, incorporating HIPs (e.g., active learning activities, higher-order learning) in courses relies on the intrinsic motivation and attitude of the instructor to perform such tasks in the classroom [8,11,20,28]. A focus on motivation will not affect those who are otherwise unconcerned; the lack of interest will result in unchanged instruction [11,27]. Additionally, scholars have reported that instructors may not implement problem-based learning, a type of HIP, if it is not relevant to the evaluation of their teaching [10]. This suggests that institutional support for HIPs via student evaluations is a powerful source of extrinsic motivation that can address individual concerns and lead to their adoption.

2.2. Barriers to Teacher Change

The literature on “barriers” to teacher change is also large and spans several decades, investigating both individual and institutional factors that influence instructional change simultaneously. Carbone et al. [11] suggest this body of research has identified the following barriers: lack of confidence in implementing changes to teaching, lack of knowledge about different approaches to teaching, insufficient resources, student-related issues, competing institutional priorities, perceived academic identity, and lower prioritization of teaching in higher education. Their review of the literature published between 2010 and 2018 revealed a division of perceived barriers into several schema [11]. Some studies label barriers as either internal (within personal control) or external (outside individual control). Other categorization systems attempt to capture differences in individual/personal, group/department, institutional, or other (i.e., curricular, technical infrastructure, cultural) barriers.

There is meaningful overlap between internal/individual/personal barriers identified in this line of work and the concerns-based literature discussed in the previous section. However, the barriers framework highlights the centrality of external factors in the teacher-change process: instructor concerns may be tied to these larger organizational or institutional factors beyond the individual’s control, but barriers play an outsized and independent role in one’s decision to adopt a new teaching practice. The research has revealed that decisions made by the university (i.e., institution) [11,20], lack of resources (i.e., technology training or teaching assistants) [29,30], the lack of relevance of HIPs in the end-of-course student evaluations [10], and lack of support for teaching within the department or institution [11] are barriers to the application of evidence-based instructional practices.

Some researchers argue that classroom size can be a barrier to adopting HIPs [11], whereas other scholars maintain that HIPs can be implemented with any number of students [31,32]. Ultimately, the lack of engagement with and implementation of HIPs in large classroom settings decreases student interest in course topics [10]. Studies have also revealed that lack of support from departments and faculty has a direct impact on the ability of academic teachers to manage multiple job responsibilities [33,34]. For example, a lack of support and communication from co-workers (i.e., faculty) within their department leads to feelings of isolation among overwhelmed instructors and ultimately discourages them from improving their teaching [11,20]. While time is often cited as a barrier to change, the reality is that there are many strategies for mitigating this perceived limitation to implementing evidence-based teaching practices [35,36]. However, the difficulties associated with time limitations can extend beyond implementing time-management strategies.

Our work draws on the concept of institutional-level barriers from this body of work, in addition to the concept of individual-level concerns from the CBAM. We conceptualize all factors outside of an individual instructor's control but within the structure or control of an institution as a barrier to adopting HIPs. We recognize that this elides the difference made in the barriers literature between department- or group-level and institution-level factors. However, we argue that this subsumption is logical due to an emerging sense that there are factors outside of the control of institutions of higher education themselves. We propose that these factors represent obstacles—in fact, they are some of the biggest hurdles and greatest challenges—to the adoption of HIPs.

2.3. *Obstacles Preventing Teacher Change*

Similar to concerns and barriers, obstacles also negatively impact adoption of HIPs; however, obstacles are uncontrolled either by the self or institution. Rather, an obstacle is an external, exigent factor that impacts an individual's ability to participate in the change process. This concept, to our knowledge, has not been well-documented in the literature regarding the adoption of pedagogical practices. This study has supported the development of this category, as study participants have indicated external factors that influence the adoption and implementation of HIPs.

One factor that emerged during our work as an obstacle is the perceived external cultural factors. The previous research has identified cultural factors affecting instruction, such as student demographic characteristics and preparedness [11], student attitudes toward active learning strategies [20,37], beliefs/attitudes and values about teaching and learning [20,38], and institutional norms and traditions [20]. While this research characterizes perceived cultural barriers as external to the individual, they often recommend remedies that rely on the instructor implementing new teaching techniques. We suggest that faculty perceive student culture or societal conditions affecting higher education as beyond the control of both themselves and their institutions. As a result, these obstacles stand in the way of faculty implementing HIPs.

For example, the barriers literature recognizes that teacher beliefs and values are essential to the change process. There is great variation among groups of teachers with regard to what constitutes good teaching and the sources of these beliefs are complex and difficult to address [38]. Beyond teacher, administrator, and student beliefs, the public at large also holds a belief and values system pertaining to teaching and learning which affect educational institutions' ability to promote change [38]. Thus, the political context of reform at a societal level—and parental resistance to the desired changes—presents as an external obstacle to change.

These studies also reveal that perceptions about student attitudes are obstacles to implementing HIPs [11,20,39,40]. Undergraduates prefer lectures because this teaching style enables students to pass exams by relying on remembering concepts [41–44]. Changing student preferences or expectations is also an obstacle to change beyond the direct influence, on the whole, of individuals and institutions [38]. Shell [37] found students' preference for memorization dissuades faculty from implementing critical thinking activities. Instruc-

tors also have expectations that students complete assigned homework and participate and attend lectures and course activities [39]. When these expectations are not met, an obstacle emerges. Additionally, instructors may struggle to implement evidence-based teaching practices in classes where students have varying assumptions about the course content [45,46].

As our study took place following the abrupt transition to asynchronous and/or remote online teaching during the emergence of the COVID-19 pandemic, this external, exigent factor also influenced participants' perceptions. Several aspects of COVID-19 conditions served as obstacles to improving instruction. During this time, pedagogy was impacted, as instructors often lacked the fundamental knowledge to effectively teach in a computer-mediated environment. As this shift was unprecedented and unexpected, resources were not readily available in the spring of 2020 [47]. Subsequently, HEIs responded by providing an abundance of resources for online teaching after the spring 2020 semester concluded. While instructors and institutions forcibly reacted to the conditions, the conditions were external and necessitated a reaction.

In addition to exacerbating challenges faced by institutions and instructors, the COVID-19 pandemic conditions impacted students. Issues related to students' mental health became overwhelmingly apparent during the initial stages of the pandemic. The COVID-19 pandemic resulted in increased levels of stress and anxiety experienced by a vast majority of undergraduate students [48]. These stressors included the fear and worry for oneself or loved ones, constraints on physical movement and social activities due to quarantine, radical lifestyle changes, disruptions to sleep patterns, and increased concerns regarding academic performance. With increased mental health issues and reduced student motivation, HEIs and instructors were faced with an unforeseen obstacle and were subsequently challenged with the task of reacting and offering new types of support.

Not only are college students vulnerable to mental health issues, but they are also vulnerable to more "basic needs" issues like food, housing, and income even during non-pandemic times [49]. Challenges presented in the following ways: loss of access to technology due to lack of campus resources, loss of income due to job loss, and loss of childcare due to centers and K-12 schools closing [49]. Responding comprehensively to these obstacles was primarily outside of the control of individuals and institutions.

2.4. Concerns, Barriers, and Obstacles: A Framework

Our emerging framework for understanding the decision to make changes to instruction or not is represented in Table 1. It underscores the simultaneous but separate impact that individual concerns, institutional barriers, and extraneous obstacles have on an instructor's decision to adopt HIPs or continue implementing traditional teaching practices. We argue that these micro-, mezzo-, and macro-level factors fully encapsulate the range of considerations at play in the process of deciding whether and how to improve one's teaching. They may lead to the adoption of an HIP or the decision not to change instructional practices.

Table 1. Factors that influence adoption of HIPs.

Term	Definition
Concerns	Personal/individual factors within the control of individuals (i.e., instructors)
Barriers	Factors related to the structure of or decisions made by the institution (i.e., the university) that are outside of the control of individuals
Obstacles	Factors outside the control of individuals and institutions (i.e., exigent factors)

3. Materials and Methods

Data for this paper are part of a larger research project investigating the use of and barriers to adopting HIPs in science, mathematics, and social science general education courses at a midwestern metropolitan university that utilized a mixed-methods approach.

The quantitative portion of this project involved administering the Teaching Practices Inventory (TPI) [50] to instructors of introductory STEM courses in order to gather descriptive data about actual teaching practices and the use of HIPs. This paper focuses on interviews conducted to explore those teaching practices and experiences with HIPs in depth, to learn about instructors' beliefs about high-quality teaching, and understand potential barriers to good teaching or concerns about adopting HIPs.

3.1. Sample

We conducted interviews with 13 faculty members who had also participated in the quantitative portion of the study focused on determining the types and prevalence of research-verified HIPs used in the classes they teach. Interviewees were selected from a stratified random sample; all survey participants were divided into quartiles based on their scores on the TPI [50] and randomly assigned for interviews. Of the 30 individuals assigned to the interview group, 13 agreed to be interviewed (43% response rate). We interviewed roughly equal numbers of faculty from each of the quartiles representing high-to-low use of HIPs, with slightly lower representation from quartile two. Faculty members interviewed represent a range of disciplines (i.e., chemistry, physics, mathematics, sociology, and communication studies). Additional information about the interviewees can be found in Table 2.

Table 2. Attributes of participants.

Pseudonym	Gender	Tenured	Rank/Position	College	HIP Quartile (1 = High Use)
Amanda	Did not report	No	Full-time Instructor	Fine Arts and Media	1
Betty	Woman	No	Full-time Instructor	Arts and Sciences	1
Leneve	Man	No	Full-time Instructor	Arts and Sciences	1
Titus	Man	Yes	Professor	Arts and Sciences	1
Jake	Man	Yes	Associate Professor	Arts and Sciences	2
Corri	Woman	No	Part-time Instructor	Arts and Sciences	2
Ron	Man	No	Part-time Instructor	Public Affairs and Community Service	3
Ally	Woman	No	Assistant Professor	Fine Arts and Media	3
Tiana	Woman	No	Part-time Instructor	Public Affairs and Community Service	3
Ana	Woman	Yes	Associate Professor	Arts and Sciences	3
Nate	Man	Yes	Professor	Arts and Sciences	4
Felicity	Woman	No	Full-time Instructor	Arts and Sciences	4
Terry	Man	Yes	Associate Professor	Arts and Sciences	4

3.2. Procedures

Data were collected using semi-structured, in-depth interviews that lasted an hour on average. Interviews were conducted during the spring 2021 semester via Zoom due to COVID-19 restrictions on research protocols. Interviews were recorded and zoom-

generated transcripts were cleaned before being coded. After transcripts were completed, the interviews were destroyed in order to assure the privacy of participants and to comply with IRB. Our interview protocol was designed to include all aspects of a concerns-based adoption model (CBAM), described above, which is the basis for our larger research study. Interview questions were broadly written to allow instructors the freedom to reflect on perceptions of good teaching (e.g., describe good teaching; tell me a success story in teaching), barriers to good teaching (e.g., what do you perceive as barriers to good teaching?), teaching concerns (e.g., when you think about teaching, what are you concerned about?), teaching practices (e.g., tell me about how you assess your students; how do you connect students to the material? What are your thoughts on students evaluating you?), factors that serve as levers for change in teaching practices (e.g., what factors support your effectiveness in teaching? What are some obstacles to teaching effectively?), and resources used to improve teaching (e.g., what resources do you use to improve your teaching?). In this analysis, we present relevant findings regarding barriers to good teaching and concerns about teaching as they pertain to the adoption and use of HIPs.

Because the interview protocol was based on specific components of a CBAM of educational change and research-verified HIPs, we developed and refined codes based on these research-identified concepts. This practice is similar to protocol coding, a procedural coding method that uses pre-established coding systems or prior research to develop codes [51]. Teaching practice codes were taken from the TPI list of evidence-based teaching techniques. Practices discussed by instructors were coded if they exemplified HIPs such as organizing knowledge and information, reducing cognitive overload, supporting student motivation, participating in applied learning experiences (i.e., guided practice), providing feedback, engaging in metacognition, and providing opportunities for group learning [50]. Codes for concerns about teaching practices or the adoption of HIPs were taken from the Stages of Concern Framework and applied if the participant indicated they were unconcerned about adopting a new teaching practice, if they were focused on how the adoption would impact themselves or their students, or whether they were focused on the task of adopting a new teaching practice [52]. Barriers to adopting HIPs were coded in two different ways. First, we coded for common institutional-level factors that would drive faculty to adopt or decline to adopt HIPs. Second, we coded for the role resources, which included social or emotional support, monetary incentives, and environmental factors (equipment, technology, etc.), in order to determine how these factors promote or prohibit the adoption of HIPs.

During the first cycle of coding, two researchers applied these codes independently to each of the interview transcripts individually and then engaged in collaborative coding to ensure intercoder reliability. During the second cycle of coding, the researchers engaged in a thematic analysis to identify patterns and trends in the data across all of the interviews regarding common concerns, barriers, obstacles, and perceived supports related to adopting HIPs. NVivo, a qualitative coding software, was used for all coding procedures and data analysis.

4. Results

Overall, when asked to discuss concerns, barriers, or obstacles to good teaching, participants identified a number of individual, institutional, and exigent external factors that inhibited their ability to or interest in adopting HIPs.

4.1. Concerns

Individual-level concerns over adopting HIPs were coded according to whether the concern expressed was related to themselves or impact on their students or the task of implementing a new teaching practice. Most of the individuals who reflected on how adopting a new teaching practice will impact themselves, focused on a lack of time or energy to make changes. Jake, an associate professor of chemistry who has about 10 years

of teaching experience and is a high-level HIP user, revealed that it is tricky to keep up with research pursuits while also being a good instructor.

Time is one because, if you want to do something, or change something in your class that, that definitely takes some time. Umm, so I mean that's even if you're deciding to do group work or peer instruction stuff or just in time teaching or whatever it happens to be. You have to develop that and that and that takes, that takes some time. And so, where do you fit that time in? It's definitely tricky if you're trying to do in the middle of the semester, while still doing your research pursuits. (Jake)

Part-time participants discussed that they had other obligations that limited the amount of time they focused on their course. Since part-time faculty were being pulled in multiple directions, they reported that it could be difficult to engage in HIPS, such as offering timely feedback. Corri, an adjunct instructor with five years of teaching experience and who is also a high-level HIP user, discussed how time management was a concern, since she had competing interests since teaching was not her primary source of income.

In my teaching, the biggest thing is that I'm an adjunct, so I have limited time. This is my part-time job. . . I would say the biggest thing is just time and competing interests for time for me, because well, I think that I'm rather responsive and available to the students. Sometimes things like getting feedback to them and things like that just it's not the top priority with all the competing interests. . . (Corri)

Very few instructors were concerned about the task-based issues of constructing, adopting, and implementing HIPs. However, individuals focused on tasks were the most likely to speak directly about specific teaching practices. Assessments were discussed most, with task-focused participants utilizing traditional methods of assessment (e.g., tests, papers, quizzes, etc.) and engaging in traditional lecture-style teaching. For example, Ron, a part-time instructor with five years of experience teaching who is a low-level HIP user, recently started integrating videos into his lecture, but continues to mostly utilize traditional methods. While he is attempting to improve his teaching practices, his use of traditional pedagogies extends to how he assesses students and includes relying on exams and written assignments.

How I evaluate is, is really what they do every week. They have to do some type of a post, understanding of concept. I give two exams, a midterm and a final, and I have them write a paper about a specific combustion event just to. . . just to give them a reality of these are significant things and they've been impactful. (Ron)

Those concerned about the impact of adopting a teaching practice on students were more likely to be using HIPs, though only a few individuals appear to consistently engage students in practice or use innovative assessments such as video/podcast assignments or experiential learning like field trips and community-based projects. Felicity, for example, a full-time instructor who identified as a low-level user with more than 20 years of teaching experience, described connecting students to content by engaging them in service-learning projects.

Last semester we also worked with the food bank, and they interviewed Food Pantry leaders and asked them how COVID was impacting their operations, how is it impacting need, and the students were so blown away to know that all these people were volunteers and how hard they were working in their communities to help their neighbors. And so that's what I strive for, is for students to see people who are actively working on improving their community, and hopefully trigger something in them to know that like, you can make a difference in your community. (Felicity)

Felicity, despite scoring lower on the TPI inventory, clearly expressed a commitment to HIPs that is strong as she talked about this service learning/community based assignment. Her sentiment epitomizes the strongest HIP adopters who focus mostly on the impact research-based teaching practices have on their students and student learning.

4.2. Barriers

As has been found in the previous research, a significant number of interviewees indicated that environmental resources (e.g., physical space, proper technology, etc.) were a barrier to adopting HIPs [11,20]. Nearly all discussed classroom size or how physical classroom spaces—in particular, classrooms with rows of chairs that could not be moved or the need for tables and white boards—impacted their ability to use group work, demonstrations, or other active learning techniques. Part-time faculty revealed that they were not provided with the necessary environmental resources (e.g., physical office space, proper technology, etc.) to complete tasks associated with their roles, which acted as a barrier to engaging in HIPs. For example, part-time faculty were not provided computers by the university, even when courses switched to all online during COVID. Tiana, who has worked as an adjunct instructor for at least six years, discussed how she had never been provided a laptop to effectively engage as an instructor even during COVID.

Do we have the right training to help instructors or adjuncts? Do we have the right technology? I have forever used my own personal computer because I don't think there's another option so you know just, does Union University have the ability to say hey, let us help you purchase a laptop? (Tiana)

Full-time faculty, conversely, were provided with laptops, offices, and other necessary resources to effectively complete teaching tasks; thus, full-time faculty were less likely to mention resources as a barrier. While environmental resources were not mentioned by full-time faculty, they reported monetary barriers prevented their ability to engage students in practice sets. For example, Leneve, a full-time physics instructor with more than 10 years of teaching experience and who is a high-level HIP user, revealed that he asked the university to invest in a telescope to engage students studying science.

I requested about twenty thousand dollars for a budget for that class. And that's not to pay me, that's to buy telescope time at major observatories across the planet for the students to actually use. So an undergrad would have the ability to use telescopes that PhDs use anywhere in the world. And I said yeah you know an operating budget of about \$20,000 for five years that would probably do it. (Leneve)

Lack of professional development and other social support resources was a common theme across interviews. While some faculty discussed that social supports would be beneficial, they also noted that time was a contraindication to involvement in a community of practices. Tianna discussed the limited-to-nonexistent opportunities for faculty to make improvements to her teaching skills through peer discussion.

Give us an opportunity as instructors, especially when we're teaching a critical course like an introduction course, really wasn't the course they had concerns with because I've continued to teach it, but give us that robust feedback or let us figure out who best on campus can help us, can help you succeed, right, and that's all we want in life. (Tianna)

Compounding the issue of having inadequate resources is the barrier created by institutional processes that regulate how part- and full-time instructors are contracted to teach (e.g., one year contracts). Part- and full-time instructors described the negative impact job insecurity, low pay, and lower levels of integration into the university community had on their teaching. Both part- and full-time instructors indicated that better compensation in the contracting process could incentivize them to dedicate more time to better teaching.

Furthermore, many did not feel that the promotion or annual-review process rewarded individuals who adopted or considered adopting HIPs. Awards for teaching were not motivating factors for most. And all participants, regardless of if they taught part- or full-time, echoed that course evaluations were an institutional barrier. For instance, Felicity, a full-time instructor of geology, discussed her frustration with course evaluation, which was likely negatively impacted by her forced shift to asynchronous learning environment amid COVID.

And I know my evaluations were lower than what I had in the past, and so that was frustrating and disappointing to me. (Felicity)

Part-time faculty also indicated their dissatisfaction with course evaluations. However, this also was associated with job stability. Tianna discussed how the negative course feedback resulted in her subsequent removal from her course:

I had some negative feedback on a course. Yeah, instead of being able to sit down with someone and talk about that negative feedback, they rewarded me by removing the class from me. Yeah. Hey, that's fine. I'm an adjunct, that's okay. But then they were not honest and forthcoming. And I had to kind of dig when what I realized was that... So what I need is, what I think every adjunct needs is some type of formal review where we can sit down. (Tianna)

4.3. Obstacles

Asking faculty about individual concerns or institutional barriers to adopting HIPs during the COVID-19 pandemic revealed factors external to the university that appear to stand in the way of improving teaching. For our interviewees, COVID-19 represented an obstacle to their teaching in multiple ways. The transition to online or remote learning brought technological, pedagogical, and student challenges to light in a new way.

COVID impacted the pedagogical choices individuals made. Several instructors mentioned that they had to change group activities or assignments back to individual assessments, drop active learning activities from their course, or were unable to collect the same kind of assessment data or feedback as they had prior to the pandemic. Each of these changes marks a move away from or the decision not to adopt a HIP. Others did suggest that they worked to keep opportunities for their practice or used the move to online teaching as an opportunity to reduce cognitive overload for students. But the overwhelming sentiment was that students missed out on important educational experiences because of remote learning.

Another significant obstacle brought on by COVID was its impact on the instructor's ability to build relationships with students. This has been and will continue to be an issue, of course, but one that interviewees believed was made much more challenging in the asynchronous online environment. Many instructors in our study talked about the innovative ways in which they learned to connect with students in asynchronous or remote-learning environments, support students who were struggling, and be flexible during the move to online or remote teaching.

Additionally, COVID exacerbated the issues students face in terms of 'normal' life circumstances. Many interviewees acknowledged that students were overwhelmed, struggling with additional stressors, and in need of additional support. Titus, a tenured professor who is a high-level HIP user who has been teaching for more than 20 years, spoke about how COVID negatively impacted students.

...he had had at least four or five roadblocks that all could have stopped him from completing his degree. One is he didn't have a place to live. The second one is that he was diagnosed with COVID. He lost his sense of smell, a loss of sense of taste. In addition to all of that, he was socially isolated in a way that it was already isolated before that. The emotional toll it took on him last semester, he almost stepped out. (Titus)

Student culture also appears as an obstacle in our analysis, something beyond the control of instructors and external to the university. Interviewees reflected on issues of equity and equality in the educational system at large, the individual quality of students who are admitted into the university, and specific aspects of college preparedness in terms of skills or knowledge. Betty, who is a full-time instructor with 20 years of experience and a high-level HIP user, discussed inequalities observed in academia, noting that the university should support students to assure success.

And my reaction to that was. So, if you're not going to require students, basically non-white students to not show their work. You're 100% setting them up for failure. The very,

very thing you're trying to do. You're going to hurt them. And so, to keep, keeping things equitable. But truly equitable like, making sure everybody has the (sic) equal chance, like you're not given a different chance, you're given an equal chance. (Betty)

Participants also noted that it was difficult to use HIPs such as organizing student knowledge when students did not demonstrate the skills necessary to succeed in college. Tianna noted how students were not prepared to enroll in college.

I see my, my, my, one of the challenges is bringing students into college setting, and they're ill-equipped, they're ill-prepared. They don't know... they don't know basic sentence structures. (Tianna)

5. Discussion

Overall, only a few individuals in our study appear to consistently engage students in evidence-based HIPs. This is consistent with the previous research. These high-level users discussed, in great detail, specific HIPs like student-centered assessments of skills and knowledge, hands-on opportunities to practice, chunking learning, or other techniques like group- or inquiry-based learning and described how these practices empowered students. Several spoke about how they have applied pedagogical knowledge in their classroom to increase student motivation (e.g., explaining why an assignment matters) or to improve knowledge organization (e.g., communicating learning outcomes) and the direct impact it had on student learning. This means that most individuals in our study did not specifically discuss HIPs. A number of concerns, barriers, and obstacles to adoption emerged from our interviews.

With regard to concerns among individuals who did not use HIPs, there was simply a lack of concern regarding the utilization of research-based teaching practices. Few 'task' or 'self' concerns were relayed by these instructors. This was particularly true for those who stated that adequate professional-development opportunities were not readily available. Individuals who are not concerned with improving their teaching will neither seek out professional-development opportunities nor recognize the value of pedagogical training.

The university does provide ample opportunities to participate in pedagogical workshops and communicates frequently about these opportunities via email. While this information was and continues to be passively disseminated, some participants actively sought out these workshops, but others did not. It is unclear whether this is because they did not read the emails, or if they read the email and continued to lack interest in professional-development opportunities. In addition to the university offering a variety of pedagogical development experiences, all participants had the capability to seek out external experiences to improve teaching practices. Regardless of the rationale for not participating in professional-development workshops, the lack of motivation to seek out and participate in professional development demonstrates a lack of concern for improving overall teaching practices and thus engaging in HIPs. This finding suggests that the individuals who may benefit most from training in implementing HIPs are not going to seek out professional development on their own [53–55].

There were some individuals who shared self-based concerns about professional development or training opportunities. Several faculty members reported that they were not up to date on current teaching initiatives because they did not have the proper education and this impacted their ability to engage in HIPs. With proper training in specific research-based teaching practices, these teachers can develop the knowledge and confidence needed to consider implementing HIPs. Another participant identified support that may be of use for individuals with self- or task-based concerns about developing HIPs, which was consultant services. A few individuals reported that one-on-one support while building assignments and activities—both technological and pedagogical—would be beneficial to bolster the utilization of HIPs.

Faculty in the study who were already utilizing research-based teaching practices identified professional-development opportunities and campus resources that supported their efforts to explore student-centered assessment practices and other HIPs. Several

specific professional-development opportunities on campus, especially training on microaggressions and inclusive teaching, appear to have had an impact on some individual's interest and motivation to adopt practices. Participants appreciated the ability to discuss teaching practices with others at the university, develop a sense of being part of a cohort of educators who could discuss teaching challenges, and share resources about best practices with each other.

Apart from professional development and training, a few individuals suggested that there is an intrinsic reward that could motivate them to figure out what teaching practices work best for themselves and their students in spite of time demands. They revealed that personal concerns about teaching change can be overcome by focusing on the rewards associated with teaching, including positive feedback from students and peers, an individual drive to redesign curriculum or invest time in revamping class activities on their own, and the role of personal enthusiasm in dedicating effort to good teaching.

A few instructors suggested that a stronger sense of support, a sense of groupness or belonging, having someone to discuss teaching with, and better access to resources would help motivate them to implement HIPs. This is consistent with the research finding that task-based concerns are best mediated by helping to develop motivation, desire, and interest in improving teaching. Communities of inquiry around adopting HIPs may also be a strong avenue for mentoring; individuals who use HIPs because of the value of the impact of these teaching practices on student learning outcomes can share this with others who may be more concerned with the effect of implementing HIPs on themselves or who are concerned about the actual development of these activities.

Only two interviewees mentioned having access to pedagogical resources or disciplinary-based academic writing like the scholarship of teaching and learning beyond what is available on campus. Opportunities to increase access to these types of resources is one potentially strong avenue for campuses to pursue. Ensuring that faculty are connected to the best teaching practices within their disciplines, in addition to general professional-development opportunities, can be a rich mechanism to create networks of scholars who share ideas for implementing HIPs and accountability for increasing student outcomes and good teaching.

Participants in this study revealed a variety of institutional barriers to engaging in high-impact teaching practices. Barriers ranged from being provided adequate resources, job security and contracting processes, and how faculty are evaluated. The employment status of the participant (i.e., part-time or full-time) appeared to influence perceived barriers to utilizing HIPs. For example, part-time instructors who typically teach one or two classes as contingent faculty were more likely to indicate that resources negatively impacted their ability to utilize HIPs. Full-time tenured or tenure-track faculty were less likely to make mention of resources. When HEIs neglect part-time instructor's needs—basic needs like access to a computer or office space—they are creating an institutional barrier to good teaching that significantly impacts student learning. Ameliorating this inequality between part- and full-time faculty to the greatest extent possible is crucial.

Relatedly, administrative practices also emerged as a serious barrier to using HIPs. Contracting practices in the case of part- and full-time instructors lessened the likelihood that they would integrate HIPs, making many feel that it was not worth the effort and time changes to their teaching would take if those changes would not be valued by the institution [10,11,20]. The use of one-year contracts and the practice of removing part-time instructors from classes creates disincentives too. Job instability makes it difficult for parttime instructors to invest in training and motivation to engage in research-based teaching practices.

For all types of faculty in our study, the extent to which institutions value HIPs and that value is reflected in and rewarded by course evaluations is also a barrier to adopting new teaching practices. This echoes findings from previous research [10]. While few of our interviewees noted that teaching was not their primary academic identity, most did suggest that teaching did not feel like the top priority at this institution. Often, this barrier

was expressed through the language of time. Time was a mitigating factor for participants to employ HIPs regardless of whether instructors were employed full- or part-time. As is the case in previous research, full-time participants noted that teaching takes time and it is difficult to balance good teaching with other responsibilities assigned [11,20]. In spite of the fact that teaching was not their full-time job, many part-time instructors exhibited a commitment to overcome a lack of time and to engage in HIPs because of the impact it has on student achievement. By addressing the barrier posed by institutional values and prioritizing teaching—through the merit and promotion process, awards, evaluations, or other resources and supports—investing in HIPs becomes time well spent rather than a factor that inhibits their implementation.

The COVID-19 pandemic, arguably outside of the control of every individual and organization at the time, had a tremendous effect on what interviewees discussed when asked to reflect on barriers to good teaching. As has been found in the previous research, most interviewees noted that the pandemic increased their need for technological support from instructional designers and IT personnel [47]. For many, this was the first time they became aware of such support staff and offices on campus and credited this resource as being central to them navigating the move to online teaching. The timing of our interviews is likely what prompted a significant discussion of particular technologies like canvas, Zoom, voice-over PowerPoint, and the role of IT or digital learning support services by instructors.

Student culture, characteristics, attitudes/motivation, preparedness, and other qualities had been identified as barriers to adopting HIPs prior to the pandemic [11,20,37–39]. But, we note a significant shift in tone in terms of the way student culture was discussed. Rather than mimicking the language in previous research about barriers, aspects relating to students and the larger socio-cultural context took on more meaning. It felt as if those factors were being seen as beyond the control of individuals and institutions in such a way that they could not be subsumed under the category of institution-related barriers any longer; we believe it emerged as an obstacle to adopting HIPs.

Our interviewees may have perceived these obstacles in a new way because of pandemic teaching. Or, the current socio-cultural context of higher education today could be the cause of a change in tone. For example, their attempts to help students respond to the challenges they faced [49] was an obstacle to good teaching. It affected their ability to stay emotionally engaged and motivated to teach. And, the added stress and workload of teaching during the pandemic made changing teaching practices beyond the adoption of new technologies out of necessity overwhelming [48]. There was also a feeling that mental health issues were more prevalent among students during the pandemic and that instructors were ill-equipped to help [49]. Instructors were doing their best to provide the flexibility students needed but they identified a lack of support—from advisors or parents—for students who “fell off the radar”. A similar change in tone was revealed when instructors discussed the inequalities that impact student outcomes, whether participants focused on how students lacked fundamental knowledge rather than the university properly vetting incoming students [11]—both took on the weight of an “obstacle” to good teaching in the pandemic context.

5.1. Limitations

The timing of our study enabled us to identify unique and new concerns, barriers, and obstacles, but it may also be a limitation. These larger, macro-level obstacles may appear to be out of the control of individuals or institutions only during times of significant upheaval. The pandemic restrictions and stress created by the rapid shift to teaching remotely or online make it virtually impossible to replicate this study. We are unlikely to experience another event like the COVID-19 pandemic in exactly the same way because supports have been put into place on many campuses to help faculty move their courses out of the physical classroom. We also acknowledge our small sample of interviews conducted during the COVID-19 pandemic means our results may not be generalizable. And the participants

in this study could reflect the sample of faculty most likely to opt into educational research projects rather than the diverse population of individuals teaching at our institution [56].

5.2. Future Research

While relative consensus was obtained among participants in this study, it would be worthwhile to obtain perspectives from individuals who work at HEIs across the country. This would increase the number of participants, while offering varying viewpoints that may be impacted by geographic location and differences between types of institutions. Additional work is also needed to confirm the emergence of obstacles to good teaching and adopting HIPs. The concerns and barriers literature has accumulated long-standing evidence that there are individual- and institutional-level factors that need to be addressed when colleges or universities create initiatives to increase the prevalence and use of HIPs. More interview data beyond this project—both within an institution and across institutions—will be needed in order to confirm that there are exigent factors outside the control of individuals and institutions that impact the adoption of HIPs beyond what could be the specific influence of the swift move to remote and online teaching during the pandemic. We will continue to gather data to affirm our suggested framework of concerns, barriers and obstacles and welcome other researchers to join us in this effort.

6. Conclusions

This study sought to understand the concerns and barriers that might prevent faculty on our campus from adopting HIPs. Our work utilized two threads in the previous research to understand the individual concerns (CBAM) and institutional barriers that shape teacher change. While conducting interviews during the COVID-19 pandemic, we noticed a shift in tone when instructors talked with us about their perceptions of good teaching, barriers to good teaching, teaching practices, and the factors that supported or inhibited their efforts to improve their teaching. In addition to individual concerns and institutional barriers, many of which have been found in the previous research, we documented the presence of other exigent factors that affected the adoption of HIPs in STEM general education courses at our university. We suggest that the framework for understanding teacher change must also take these macro-level obstacles into account in order to fully theorize and articulate the support and intervention needed to help faculty improve their teaching effectiveness.

Understanding the concerns, barriers, and obstacles to adopting HIPs is necessary if we are to provide adequate supports for faculty who want to use them to support student learning. Faculty identified several internal, institutional, and exigent factors that impact their ability to engage in best teaching practices, such as time, lack of access to professional teaching-development experiences, inadequate and inequitable distribution of resources (i.e., monetary resources to support pedagogies in the classroom and technological resources to best disseminate information). In addition, student preparedness and the subsequent effects of COVID-19 served as factors that influenced participants' ability to adopt HIPs.

The researchers also noted that part-time faculty and full-time faculty experienced different treatment by institutions, which consequently impacted their ability to engage in HIPs. This imbalance was also evident in how participants with a doctoral degree were treated versus those who had not yet obtained one; thus, individuals who had not obtained a doctoral degree were less likely to receive institutional supports than their peers who had obtained a terminal degree. Comparing these groups may be beneficial in identifying the nuanced support system that is most beneficial for part- and full-time faculty of all educational levels.

Finally, we note that efforts to encourage teacher change at the individual level, are very important. However, our research also shows that attention must also be paid to the institutional-level barriers that exist on a campus. And, administrators must also recognize that individual-level concerns are embedded in a social, cultural, and political context. Ignoring obstacles outside of the control of individuals and institutions can create a feeling

of powerlessness whereas helping faculty address concerns while acknowledging this context will help them find ways around these obstacles to good teaching.

Author Contributions: Conceptualization, K.V., J.A.P. and P.M.O.; methodology, K.V. and J.A.P.; validation, K.V. and J.A.P.; formal analysis, K.V. and J.A.P.; investigation, K.V. and J.A.P.; resources, J.A.P.; data curation, J.A.P.; writing—original draft preparation, K.V., J.A.P. and P.M.O.; writing—review and editing, J.A.P., P.M.O. and C.M.; supervision, J.A.P.; project administration, J.A.P. and C.M.; funding acquisition, J.A.P. and C.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the USA National Science Foundation Directorate for Undergraduate Education, grant number #2021315.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of the University of Nebraska Medical Center (IRB protocol #535-20-EX).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The raw data are not publicly available in accordance with the IRB protocol.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Pascarella, E.T.; Terenzini, P.T. *How College Affects Students: Findings and Insights from Twenty Years Of Research*; Jossey-Bass: San Francisco, CA, USA, 1991.
2. Pascarella, E.T.; Terenzini, P.T. *How College Affects Students: A Third Decade of Research*; Jossey-Bass: Indianapolis, IN, USA, 2005; Volume 2.
3. Umbach, P.D.; Wawrzynski, M.R. Faculty do matter: The role of college faculty in student learning and engagement. *Res. High. Educ.* **2005**, *46*, 153–184. [[CrossRef](#)]
4. Pehmer, A.K.; Gröschner, A.; Seidel, T. How teacher professional development regarding classroom dialogue affects students' higher-order learning. *Teach. Teach. Educ.* **2015**, *47*, 108–119. [[CrossRef](#)]
5. Lewis, A.; Smith, D. Defining higher order thinking. *Theory Pract.* **1993**, *32*, 131–137. [[CrossRef](#)]
6. Biggs, J.B. Assessing student approaches to learning. *Aust. Psychol.* **1988**, *23*, 197–206. [[CrossRef](#)]
7. Merrill, M.D. First principles of instruction. *Educ. Technol. Res. Dev.* **2002**, *50*, 43–59. [[CrossRef](#)]
8. Stupnisky, R.H.; BrckaLorenz, A.; Yuhas, B.; Guay, F. Faculty members' motivation for teaching and best practices: Testing a model based on self-determination theory across institution types. *Contemp. Educ. Psychol.* **2018**, *53*, 15–26. [[CrossRef](#)]
9. Sturtevant, H.; Wheeler, L. The STEM faculty instructional barriers and identity survey (FIBIS): Development and exploratory results. *Int. J. STEM Educ.* **2019**, *6*, 1–22. [[CrossRef](#)]
10. Bidabadi, N.S.; Isfahani, A.N.; Rouhollahi, A.; Khalili, R. Effective teaching methods in higher education: Requirements and barriers. *J. Adv. Med. Educ. Prof.* **2016**, *4*, 170.
11. Carbone, A.; Drew, S.; Ross, B.; Ye, J.; Phelan, L.; Lindsay, K.; Cottman, C. A collegial quality development process for identifying and addressing barriers to improving teaching. *High. Educ. Res. Dev.* **2019**, *38*, 1356–1370. [[CrossRef](#)]
12. Geertshuis, S.; Lewis, N. Future Ready Graduates. Ako Aotearoa. Available online: <https://ako.ac.nz/assets/Knowledge-centre/NPF-RFP17-205-Embedding-employability-in-the-curriculum/Future-Ready-Graduates-Final-Report.pdf> (accessed on 22 April 2022).
13. Stephenson, J.; Yorke, M. *Capability and Quality in Higher Education*; Routledge: New York, NY, USA, 2013.
14. Whiting, K. What Are the top 10 Job Skills for the Future? *World Economic Forum*. Available online: <https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/> (accessed on 22 April 2022).
15. Cohen, D.K. *Teaching Practice: Plus Ça Change. Issue Paper 88-3*; East Lansing: The National Centre for Research on Teacher Education; Michigan State University: East Lansing, MI, USA, 1988.
16. Rau, W.; Baker, P.J. The organized contradictions of academe: Barriers facing the next academic revolution. *Teach. Sociol.* **1989**, *17*, 161–175. [[CrossRef](#)]
17. Wieman, C. A better way to evaluate undergraduate teaching. *Chang. Mag. High. Learn.* **2015**, *47*, 6–15. [[CrossRef](#)]
18. Hall, G.E. Evaluating Change Processes: Assessing extent of implementation (constructs, methods and implications). *J. Educ. Adm.* **2013**, *51*, 264–289. [[CrossRef](#)]
19. Anderson, S. Understanding Teacher Change: Revisiting the Concerns Based Adoption Model. *Curric. Inq.* **1997**, *27*, 331–367. [[CrossRef](#)]

20. DaRosa, D.A.; Skeff, K.; Friedland, J.A.; Coburn, M.; Cox, S.; Pollart, S.; O'connell, M.; Smith, S. Barriers to effective teaching. *Acad. Med.* **2011**, *86*, 453–459. [[CrossRef](#)]
21. Coady, D.A.; Walker, D.J.; Kay, L.J. Teaching medical students musculoskeletal examination skills: Identifying barriers to learning and ways of overcoming them. *Scand. J. Rheumatol.* **2004**, *33*, 47–51. [[CrossRef](#)] [[PubMed](#)]
22. Jackson, M.A.; Moon, S.; Doherty, J.H.; Wenderoth, M.P. Which evidence-based teaching practices change over time? Results from a university-wide STEM faculty development program. *Int. J. STEM Educ.* **2022**, *9*, 1–15. [[CrossRef](#)]
23. Belt, E.; Lowenthal, P. Developing faculty to teach with technology: Themes from literature. *TechTrends* **2020**, *64*, 248–259. [[CrossRef](#)]
24. Harris, J.; Mishra, P.; Koehler, M. Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration reframed. *J. Res. Technol. Educ.* **2009**, *41*, 393–416. [[CrossRef](#)]
25. Mishra, P.; Koehler, M.J. Technological pedagogical content knowledge: A framework for teacher knowledge. *Teach. Coll. Rec.* **2006**, *108*, 1017–1054. [[CrossRef](#)]
26. Zamfir, B. Higher Education Faculty and Technology: The Impact of Discipline, Course Level and Pedagogy on Technology Selection by Faculty in Higher Education Classrooms. Ph.D. Thesis, Southern Connecticut State University, New Haven, CT, USA, 2021.
27. Dudek, N.L.; Marks, M.B.; Regehr, G. Failure to fail: The perspectives of clinical supervisors. *Acad. Med.* **2005**, *80*, S84–S87. [[CrossRef](#)] [[PubMed](#)]
28. Blackburn, R.T.; Bieber, J.P.; Lawrence, J.H.; Trautvetter, L. Faculty at work: Focus on research, scholarship, and service. *Res. High. Educ.* **1991**, *32*, 385–413. [[CrossRef](#)]
29. Arslan, O.; Kamali Arslantas, T.; Baran, E. Integrating technology into an engineering faculty teaching context: Examining faculty experiences and student perceptions. *Eur. J. Eng. Educ.* **2021**, *47*, 394–412. [[CrossRef](#)]
30. Martin, F.; Polly, D.; Coles, S.; Wang, C. Examining higher education faculty use of current digital technologies: Importance, competence, and motivation. *Intern. J. Teach. Learn. High. Educ.* **2020**, *32*, 73–86.
31. Felder, R.M.; Brent, R. *Teaching and Learning STEM: A practical Guide*; Jossey-Bass: San Francisco, CA, USA, 2016.
32. Knight, J. *High-Impact Instruction: A Framework for Great Teaching*; Corwin Press: Thousand Oaks, CA, USA, 2012.
33. Higgins, K.; Harreveld, R.E. Professional development and the university casual academic: Integration and support strategies for distance education. *Distance Educ.* **2013**, *34*, 189–200. [[CrossRef](#)]
34. Klopper, C.; Power, B. The casual approach to teacher education: What effect does casualisation have for Australian university teaching? *Aust. J. Teach. Educ.* **2014**, *39*, 101. [[CrossRef](#)]
35. Brzezinski, M.; Kukreja, J.; Mitchell, J.D. Time-efficient, goal-directed, and evidence-based teaching in the ICU. *Curr. Opin. Anesthesiol.* **2019**, *32*, 136–143. [[CrossRef](#)] [[PubMed](#)]
36. Irby, D.M.; Wilkerson, L. Teaching when time is limited. *BMJ* **2008**, *336*, 384–387. [[CrossRef](#)] [[PubMed](#)]
37. Shell, R. Perceived barriers to teaching for critical thinking by BSN nursing faculty. *Nurs. Educ. Perspect.* **2001**, *22*, 286.
38. Anderson, R.D. *Study of Curriculum Reform [Volume 1: Findings and Conclusions] Studies of Education Reform*; Office of Educational Research and Improvement: Washington, DC, USA, 1996.
39. Braga, M.; Paccagnella, M.; Pellizzari, M. Evaluating students' evaluations of professors. *Econ. Educ. Rev.* **2014**, *41*, 71–88. [[CrossRef](#)]
40. McLaughlin, J.E.; McLaughlin, G.W.; McLaughlin, J. Using composite metrics to measure student diversity in higher education. *J. High. Educ. Policy Manag.* **2015**, *37*, 222–240. [[CrossRef](#)]
41. Armstrong, P. Bloom's Taxonomy. Vanderbilt University Center for Teaching. Available online: <https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/> (accessed on 6 May 2022).
42. Bloom, B.S. *Taxonomy of Educational Objectives, Handbook: The Cognitive Domain*; David McKay: New York, NY, USA, 1956.
43. Forehand, M. Bloom's Taxonomy: Original and Revised. Emerging Perspectives on Learning, Teaching, and Technology. Available online: <http://projects.coe.uga.edu/epltt> (accessed on 22 April 2022).
44. Krathwohl, D.R. A revision of Bloom's taxonomy: An overview. *Theory Pract.* **2002**, *41*, 212–218. [[CrossRef](#)]
45. Bruggen, J.M.V.; Boshuizen, H.; Kirschner, P.A. A cognitive framework for cooperative problem solving with argument visualization. In *Visualizing Argumentation*; Kirschner, P.A., Shum, S.J., Carr, C.S., Eds.; Springer: London, UK, 2003; pp. 25–47.
46. Piaget, J. Part I: Cognitive development in children: Piaget development and learning. *J. Res. Sci. Teach.* **1964**, *2*, 176–186. [[CrossRef](#)]
47. McKenzie, L. Ramping Up for Remote Instruction. *Inside Higher Ed.* 2020 May 26. Available online: <https://www.insidehighered.com/news/2020/05/27/new-resources-help-support-faculty-quality-online-instruction> (accessed on 6 May 2022).
48. Son, C.; Hegde, S.; Smith, A.; Wang, X.; Sasangohar, F. Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *J. Med. Internet Res.* **2020**, *22*, e21279. [[CrossRef](#)] [[PubMed](#)]
49. Goldrick-Rab, S.; Coca, V.; Kienzl, G.; Welton, C.; Dahl, S.; Magnelia, S. Real College during the Pandemic: New Evidence on Basic Needs Insecurity and Student Well-Being. Available online: https://hope4college.com/wp-content/uploads/2020/10/Hopecenter_RealCollegeDuringthePandemic_Reupload.pdf (accessed on 22 April 2022).
50. Wieman, C.; Gilbert, S. The Teaching Practices Inventory: A new tool for characterizing college and university teaching in mathematics and science. *CBE—Life Sci. Educ.* **2014**, *13*, 552–569. [[CrossRef](#)] [[PubMed](#)]
51. Saldana, J. *The Coding Manual for Qualitative Researchers*; Sage: London, UK, 2009.

52. George, A.A.; Hall, G.E.; Stiegelbauer, S.M. *Measuring Implementation in Schools: The Stages of Concern Questionnaire*; Southwest Educational Development Laboratory: Austin, TX, USA, 2006.
53. Friedland, J.A. Social learning theory and the development of clinical performance. In *Residents' Teaching Skills*; Edward, J.C., Friedland, J.A., Eds.; Springer: New York, NY, USA, 2002; pp. 18–37.
54. Greenberg, L.; Blatt, B.; Keller, J.; Gaba, N. Can a Residents as Teachers Program Impact a Department's Educational Transformation? *J. Fac. Dev.* **2016**, *30*, 41–46.
55. Skeff, K.M.; Stratos, G.A.; Mygdal, W.; DeWitt, T.A.; Manfred, L.; Quirk, M.; Roberts, K.; Greenberg, L.; Bland, C.J. Faculty development: A resource for clinical teachers. *J. Gen. Intern. Med.* **1997**, *12* (Suppl. S2), S56. [[CrossRef](#)]
56. Piza-Mir, B.; Moreno-Vecino, B.; Monserrat-Monserrat, M.V. Interest of non-university teachers in educational research projects. *REIRE Rev. D'innovacio Recer. Educ.* **2023**, *16*, 1–13. [[CrossRef](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.