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EDUCATIONAL LEADERSHIP & MANAGEMENT | RESEARCH ARTICLE

The effect of the COVID pandemic on faculty adoption of online teaching: reduced resistance but strong persistent concerns

Georgette Dumont¹, Anna Ya Ni², Montgomery (Monty) Van Wart^{3*}, Carmen Beck⁴ and Hang Pei⁵

Abstract: This article examines a case study regarding pre- and post-COVID-19 faculty adoption patterns for online teaching. It is based on a usable sample of 184 faculty from a relatively typical, teaching/research institution, in which the bulk of the faculty had some modest level of hybrid or fully online teaching. The Unified Theory of Acceptance and Use of Technology (UTAUT) is used as the framework for the analysis for this descriptive case. The findings indicate that the trajectory of increasing online teaching is likely to continue and grow, despite reasonable and persistent faculty concerns. Based on the case study and literature, twenty recommendations are provided that can encourage faculty adoption and promote high quality online implementation systems.

Subjects: Higher Education; Open & Distance Education and eLearning; Design & Delivery; ICT; Study of ODL and eLearning

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PUBLIC INTEREST STATEMENT

This article examines a case study regarding pre- and post-COVID-19 faculty adoption patterns for online teaching. The findings indicate that the trajectory of increasing online teaching is likely to continue and grow, despite reasonable and persistent faculty concerns. Overall, the case study of a U.S. institution that had a supportive environment for online teaching demonstrates that faculty at such institutions: varied extensively in their background, of whom a significant number of faculty had poor to relatively traumatic experiences, were willing by-and-large to temporarily adjust to the dramatic needs of the time with fortitude, nearly universally acknowledged learning a lot under adverse conditions when they had had little or no experience, and acknowledged (on average) that they will probably need to teach more online in the future. However, the case study also illustrates that: there remains extensive concern with online teaching related to learning online community, faculty satisfaction, knowledge outcomes, lecture presentations, student reflection, and workload considerations. Twenty recommendations for improving faculty adoption are provided.

Keywords: Online education; faculty online adoption; COVID and education; faculty concerns about online teaching; online teaching trends

1. Brief overview of online teaching statistics, and student and administrator perceptions

Despite extensive and sustained faculty resistance to online education over the long term (e.g., Bailey, 2016; Green et al., 2009; Hunt et al., 2014), there has been slow-but-steady, inexorable growth in online courses (Inside Higher Ed, 2020; Seaman et al., 2018). The COVID-19 pandemic has disrupted that trajectory with an enormous temporary surge of online courses (Hubler, 2020), ironically with a significant reduction in overall university enrollments (Hanover Research, 2020). There will inevitably be a contraction of online offerings after the pandemic subsides. This begs the larger question about how the pandemic will affect the long-term trajectory of online education. Will the negative experiences of the rush to temporary online courses create a backlash by students and faculty because of negative experiences? Will the past trajectory largely resume when the pandemic subsides? Or will the experience stretch the elasticity of demand and provide a long-term boost to online education?

While students and administrators will play primary roles, so too will attitudes of faculty (Hora, 2012), and it is that aspect of the question that we explore in this article. We review faculty adoption patterns through a review of traditional technology adoption factors and a case study examining the initial reactions of faculty to the pandemic experience.

1.1. Current statistics regarding online education in higher education

Since 2010, a 1.5% average annual overall growth rate in online teaching in higher education in the U.S. has occurred, with 35.3% of all students taking at least one online class in 2018 (U.S. Department of Education, 2019). Of those students, 18.7% were taking at least one of, but not all, their courses online, and an additional 16.6% were exclusively online students.

According to a survey of nearly 2,000 faculty (Inside Higher Ed, 2020), nearly half of all university faculty had an online teaching experience prior to the pandemic, but it was still a relatively new experience for many. U.S. faculty are overwhelmingly supportive of the increased use of technology in teaching (e.g., an online presence for messages, documents, and grading), but this does mean they are necessarily supportive of blended, synchronous, or asynchronous teaching. The distribution of online education has been relatively similar across private and public institutions, but has been skewed towards institutions specializing in online education. The top 5% of institutions constitute about 47% of distant enrollments (Seaman et al., 2018). High prestige schools have purposely lagged (TBS, 2019). Some academic disciplines have been more prone to adoption, with business and healthcare being in the lead, computer science being substantial, followed by general education and human services disciplines such as psychology, counseling, and social work (Venable, 2020).

Although approximately half the world market for online education is based in the U.S. (Dos Santos, 2019), it has been growing around the globe. India and China have become major players because of their overall size, but proportionately South Korea follows the U.S. most closely. Australia has also been an active adopter of online education (Crawford et al., 2020). The effective use of online teaching has been reported to be struggling in the face of the pandemic in China (Bao, 2020) and Japan (Kang, 2021) because of a lack of teaching innovation in adjusting to the new medium. The United Kingdom has been a leader in Europe, but the Western Europe has been catching up, albeit slowly even with the advent of the pandemic (Gaebel, 2020; Tartavulea et al., 2020). Eastern Europe and the western nations bordering Europe have been challenged greatly, but have been able to provide basic online instruction if with significant technical obstacles (Popa et al., 2020). Many other areas of the world had very low online adoption rates as well as substantial access issues prior to the pandemic including South America (Coolican et al., 2020) and Africa (Agormedah et al., 2020; Maphalala & Adigun, 2021). Rates of growth are affected by

government support, country laws, ICT capacity, technology diffusion and reliability, cultural acceptance, and economic conditions (Palvia et al., 2018).

1.2. Student and administrative perceptions in brief

Overall, students have a similar profile to faculty with regard to their perceptions of strengths and weaknesses, with students generally being more positive (Ni, 2013; Otter et al., 2013; Venable, 2020). Flexibility is the greatest driver of online education, with more moderate levels of concern about learning achievement and satisfaction, and the greatest concern about the overall learning experience (Chingos et al., 2017). Students report being most interested in taking general education and introductory courses online, and least interested in taking upper division courses online. Students also report increased workload in online courses, but unlike faculty, they do not report it as a major problem. Rather, busywork (i.e., poorly monitored assignments) is reported as the occasional problem. Concerns about technology anxiety and reliability have tapered off dramatically as concerns in recent years (Van Wart et al., 2020).

Academic and learning technology leaders have the most optimistic assessment of online education, as well as significantly different profiles of strengths and weaknesses from faculty (Allen & Seaman, 2013; Bailey, 2016; Venable, 2020). Academic leaders are more sanguine about learning achievement, learning experience, and satisfaction of students. They are concerned about keeping online learning standards high for students. Therefore, administrators continue to be most preoccupied with training, technology enhancements, student demand, and overall instructional coherence and standards such as accreditation.

2. Literature review of faculty adoption patterns of online teaching

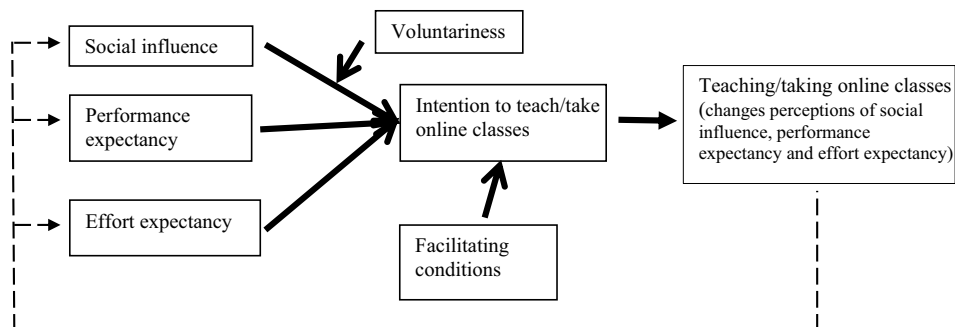
2.1. Diffusion of innovation theory

The 1980s and 1990s witnessed the increasing search for an elegant model of technology adoption in which a relatively few standard factors could account for the bulk of the variation (Venkatesh & Davis, 2000). One of the major models that emerged was the Unified Theory of Acceptance and Use of Technology or UTAUT (Venkatesh et al., 2003). The model was calibrated for adoption in organizations and closed systems and included factors related to: social influence, voluntariness, performance expectancy, effort expectancy, and facilitating conditions. These traditional technology adoption factors are used here to organize this study. See Figure 1 for the simplified model used as a framework.

Social influence can be described as the effect of those around one on their technology adoption (Lewis et al., 2013). One survey indicates that the most influential source of advice is provided by colleagues (Inside Higher Ed, 2020). However, the number had not reached 50% before the onslaught of the pandemic. Orr et al. (2009) note that poor institutional leadership is a major

Figure 1. Basic Venkatesh Adoption Model (UTAUT).

Basic Venkatesh Adoption Model (UTAUT)



barrier and this was reinforced by numerous studies that found widespread lack of support and recognition from colleagues, chairs, and deans (e.g., Bailey, 2016; Maguire, 2005). Numerous general studies allude to the influence of students on institutional and faculty decisions (e.g., Inside Higher Ed, 2020; King & Boyatt, 2015). Hunt et al. (2014) found that while student interests were important for those faculty who had online experience, they were either not significant or negative among those who did not have online experience which was the bulk of the faculty in that institutional case study. Overall, social influence has been reported as a weak factor in faculty adoption prior to the pandemic, and frequently a negative factor, modestly mitigated by increasing numbers of faculty teaching online.

Voluntariness is the degree of choice that adopters have; the less choice adopters have, the less social influence is important and vice versa. Prior to the pandemic there was a great deal of anecdotal discussion about institutional pressures to compete with online programs and about the effect of this pressure on faculty to teach online. However, there was no systematic research. Programs migrating to an online-only format and those seeking auxiliary teaching opportunities were increasingly reducing voluntariness, but only at the margins. The effect of voluntariness changed dramatically with the pandemic (Dennis, 2020; Tam & El-Azar, 2020).

Performance expectancy is the set of perceptions about the usefulness, reliability, and performance capability of the technology on work or social interactions. The leading feature of performance expectancy by a wide margin is its flexibility in timing and convenience in location. All studies that review faculty motivations for teaching online put it at or near the top of the list (e.g., Green et al., 2009; Inside Higher Ed, 2020; Tanner et al., 2011). The reliability of online teaching technology is a relatively small concern when systems work with few outages and glitches, but when systems do have reliability problems they ratchet up anxieties and frustrations enormously and can cause faculty to drop future adoption plans (Lloyd et al., 2012; Mansbach & Austin, 2018; Porter & Graham, 2015).

The performance capability of online learning is quite complex. There are at least four major aspects. Despite numerous meta-analyses finding that the learning achievement (fact and information-based aspects of learning) are equivalent (Bernard et al., 2004; Means et al., 2010; Nguyen, 2015), faculty on average are skeptical (Lloyd et al., 2012; Stewart et al., 2010; Stickney et al., 2019). When evaluating the overall learning “experience” for students including faculty-student and student-student interactions, on average faculty believe that online learning provides a substantially lower quality (Hunt et al., 2014; Inside Higher Ed, 2020; Lloyd et al., 2012; Maguire, 2005; Tanner et al., 2011), although there is also a large literature about how to increase the experiential aspects of online education (e.g., Martin et al., 2018). Faculty are also skeptical or critical of online learning because of its perceived weaknesses, with students who are younger, academically weaker, and less self-disciplined (Shen et al., 2013; Xu & Jaggars, 2014), which in turn leads to retention issues (Bawa, 2016). Faculty are also very concerned in disciplines in which labs and clinical sessions are held (Cann, 2016; Zhou, 2020). Academic integrity issues are perceived to be more problematic in online settings (Alessio et al., 2018; C. F. Rogers, 2006; Wright, 2014), especially in STEM and other disciplines generally using more objective testing (Nguyen et al., 2020; but for an alternate perspective, see Freeman et al., 2007). While the performance and technical capacities of online learning management systems increased, so too have student and faculty expectations. Thus, faculty performance expectancies had not significantly changed on average over the last 15 years at the onset of the pandemic, with flexibility and convenience being major adoption reasons, technology resiliency being of modest concern, and technology capacity being a major deterrent to adoption (Inside Higher Ed, 2020).

Effort expectancy is related to the effort it takes to master a technology, as well as the ongoing effort it takes to use the technology versus other “technologies.” The definition of technology is broad (Everett M. Rogers, 1962), so face-to-face instruction is considered an alternate technology. In the case of online instruction, there is the effort to master the technology such as the learning

management system and various software programs, an effort to build a class, and the effort to teach and maintain the class. Research on the subject generally supports the contention that online teaching takes more effort (e.g., Mupinga & Maughan, 2008; Tomei, 2006; Worely & Tesdell, 2009), but there are some mixed results (Aryal & Aryal, 2015; Van de Vord & Pogue, 2012). However, surveys of faculty opinions generally put effort as a major concern (Allen et al., 2012; Green et al., 2009; Hunt et al., 2014; Inside Higher Ed, 2020; Lawrence & Tar, 2018; Lloyd et al., 2012; Maguire, 2005; Wright, 2014; see Bailey, 2016 for an exception).

The final element in the traditional set of technology adoption factors is called facilitating conditions (Venkatesh et al., 2003). In terms of online education, it refers to the training before and during implementation of online courses, to the technical support for building courses, and to the 24-hour technical support for students and faculty having difficulties. These university support functions are universally advocated in research discussions about how to increase faculty receptivity for online teaching adoption (e.g., Horvitz et al., 2015; King & Boyatt, 2015; Lloyd et al., 2012; Mansbach & Austin, 2018; McGee et al., 2017; Panda & Mishra, 2007; Porter & Graham, 2015; Stickney et al., 2019; Zheng et al., 2018). Training and course-build assistance potentially increase performance and reduce effort, while ongoing technical support (e.g., a tech hotline) ensures that minor issues do not cause educational frustration and havoc. The presence of good facilitating conditions is generally not found to be a strong motivational factor for adoption (Abdekhoda et al., 2016; Casdorff, 2014) unless linked to incentives (Herman, 2013; Orr et al., 2009), but lack of good facilitating conditions is generally found to be a powerful disincentive when perceived as weak or missing (Bailey, 2016; Botha-Ravayse & Blignaut, 2017; Green et al., 2009; Hunt et al., 2014). While facilitating conditions are generally perceived far better at universities with a substantial long-term presence in online education than was the case in the past (Allen & Seaman, 2013; Inside Higher Ed, 2020; Lloyd et al., 2012; Maguire, 2005), it is not as clear how quickly institutions newer to online education get the necessary resources in place.

3. Research questions

The purpose of this study, then, is to investigate the effect of the COVID-19 pandemic on faculty adoption of online teaching. In addition to a literature review to assess baseline trends, there are three research questions.

- (1) *What are faculty perceptions of the strengths and weaknesses of online teaching after the initial COVID-19 onslaught at the case study institution?*
- (2) *What are the likely shifts in faculty adoption perceptions before and after the pandemic?*
- (3) *What are the broad implications for higher education of the rapid, large-scale move to online teaching required by the pandemic?*

4. Methods

4.1. Research site and sampling

The survey regarding faculty adoption was initially Beta-tested in spring 2019 approximately a year prior to the educational lockdown at a California medium-sized university with nearly 400 usable responses resulting in an unpublished internal report. The survey was then revised to update the questions to better ascertain pre- and post- pandemic perceptions at the University of North Florida which is an institution that balances teaching and research and has approximately 17,000 students (14,500 undergraduate and 2500 graduate students). The revised survey was approved by the University of North Florida's ethics institutional review board in August 2020. The Qualtrics survey was distributed to all 886 faculty, both full and part-time, on 19 August 2020. A follow-up reminder email was then sent on August 25th to those who had not completed the survey. Two emails were marked as undeliverable (i.e., bounced).

Table 1. Breakdown of face-to-face, distance learning, and hybrid courses before and after the pandemic

	2019–2020 acad. yr.*	Fall 2020*
Face-to-face	77%	23%
Distance learning (and remote learning)	21%	68%
Hybrid	3%	10%

*Data provided by the Center for Instruction and Research (CIRT).
 Rounding errors.

4.2. Survey instrument

The revised survey had a total of 52 questions, which included 42 questions to measure faculty perceptions, seven demographic questions, two questions on specific university teaching technology trainings, and one open-ended question for respondents' comments. A total of 194 surveys were started, but any survey that was incomplete was considered to have withdrawn from the survey and discarded. A total of 184 surveys were completed and usable, a response rate of 21%. For this case study, only simple statistical analysis (e.g., percentages and means) was performed.

4.3. Current online teaching trends nationally and at UNF

Nationally, approximately 46% of all faculty had taught online prior to the pandemic (Inside Higher Ed, 2020). Survey respondents indicated that 53% had taught at least one course fully or partially online; 16% had extensive experience (11 or more online or hybrid courses). Of course, in mid-March 2020, the percentage of those who have taught online surged dramatically nationally and at UNF for the period requiring robust social distancing and/or stay-at-home protocols.

Nationally, the last reliable statistics from the National Center for Education Statistics (fall 2018) report that 35.3% of all students were taking at least one online class, with 47% of that group being enrolled in fully online programs. Historical trend lines would indicate that about 37% of all students were enrolled in at least one online course in the fall of 2019 (before the pandemic). Online/hybrid teaching at UNF has been increasing as a percentage of overall teaching for many years. In the 2019–2020 academic year, on average 24% of all courses at the university were distance learning or hybrid. See [Table 1](#) below.

4.4. Demographic parameters

The response rate to the survey by academic cluster with social sciences being largest at 24% of the respondents, followed by natural sciences and medicine (23%), arts and letters (22%), law and architecture (10%) and education (9%). This is not surprising given that the Social Sciences comprise half of the faculty and students.

Of those who completed the survey, associate professors made up 30% of the respondents, followed by instructors (26%), professors (21%), and assistant professors (14%). Those who self-identified as either adjuncts or other made up 9%. The data on college and faculty ranking also track when comparing the response rate in each category to the overall university's faculty population. In addition, when looking for representativeness of the whole population, this also holds for full-time versus part-time faculty. When placing Assistant Professors, Associate Professors, and Professors into a full-time category, and the others into a part-time category, respondents track with the university's composition, albeit slightly skewed to full-time faculty (65% versus 70%) than part-time faculty (35% versus 30%).

Jacksonville, FL is the state's largest city due to it being a consolidated government. This has also resulted in less density. When the University was established in 1972, the land that was donated

by a local family was in a rural setting. Over time, the area around the university has been greatly developed, providing abundant housing options in addition to retail. In this survey, over three-quarters of the respondents (77%) live within 20 miles of the campus, 23% live from 21 miles to 50 miles, and 5% live more than 50 miles from campus.

When selecting the best population to study, the authors decided to survey all faculty including those with and without experience in teaching through technology. This differs from the Shreaves et al. (2020) study, which studied only faculty who had not taken the program offered by the university to prepare faculty for teaching online. In order to determine the impact that this type of training has on how faculty perceive teaching online, all faculty were surveyed. It should be noted that there may be a self-selection bias among those who opted to complete the survey.

Eighty-three percent of respondents indicated they had taken training in online teaching in the past from the university's faculty development program. While the high percentage may reflect response bias, since 2012, roughly 77% full and part-time faculty members, have completed some of the University's online training programs.

Because training is key to the development of high-quality online courses, a deeper analysis of which college the faculty who took the training taught in was needed. Of the 83% who attended the trainings, half of the respondents were from one college (College of Arts and Science), although proportional to the size of the college, this college also only offers 17% of the distance learning courses at the university. Conversely, the College of Health offers 38% of the distance learning courses, yet only 17% of the respondents noted having attended a training. This is similar for the College of Education and Human Services. A possible explanation is that both these colleges have used distance learning technologies to offer whole programs online in order to remain competitive in the Higher education market for some of their programs.

As of August 2020, only 5% of respondents had not taught any portion of their courses online and 18% indicated that their first online class was because of the COVID crisis. A plurality (44%) of the respondents had taught 2 to 10 courses with an online component, while 21% had taught more than 11 courses online in this category. Of those who taught online prior to the COVID pandemic, 57% had taught between 2–20 online courses, and 17% had taught more than 20 online courses. The various types of hybrid and online increased at the university from 21% of all courses in 2018–2019, to 24% in the 2019–2020 academic year, and, finally, to 77% in the fall of 2020. It should be noted that for AY 2019/20, 24% of online courses was their classification prior to the shift to all online instruction in mid-March 2020.

The gender of the respondents skews more female than male, which does not accurately reflect the university's faculty composition, with the 2020/21 data identified 50% as female and 50% as male. The university's binary categories do not allow for faculty who do not represent as male or female to select another option.

The preponderance of respondents identified as white (76%), which tracks with the ethnic representation of white faculty at the university (73%). Minority representation is as follows: 8% Asian, 6% Black or African American, 4% Hispanic, and 6% non-resident alien (in the 9% as Other category). Respondents generally tracked with the ethnic composition of faculty. See [Table 2](#) below.

Interestingly, the majority of respondents noted being born between 1944 and 1980. Considering this was a survey about teaching online, one could expect the numbers to skew younger; However, the institution has a relatively smaller number of junior faculty and thus the participation rate of assistant professors was relatively small (14%).

Table 2. Demographics

	Count	Percent	UNF*	Percent Who Had Adopted Online Teaching Prior to the Pandemic (77% of all respondents)
Gender				
Male	63	37	50	70%
Female	87	51	50	84%
Other	2	1	-	100%
Prefer not to say	17	10	-	82%
<i>Total</i>	169	100%	100%	
Ethnicity				
White (non-Hispanic)	127	76	73	76%
Hispanic or Latino	5	3	4	80%
Black or African American	5	3	6	80%
Asian/Pacific Islander	4	2	8	75%
Other	5	3	9	100%
Prefer not to say	22	13	-	82%
<i>Total</i>	168	100%	100%	
Age				
Baby Boomer, 1944-64	45	27	n/a	78%
Gen X, 1965-80	72	43	n/a	78%
Gen Y, 1981-96	31	18	n/a	71%
Other	2	1	n/a	100%
Prefer not to say	19	11	n/a	79%
<i>Total</i>	169	100%		

*Data provided by UNF Institutional Research

5. Findings

To examine if demographics have had an overall effect on online teaching adoption, we conducted a frequency analysis (that is, those having taught at least one online class before COVID-19) by demographic subgroups (see the last column of [Table 2](#)). The differences in participation in online education prior to the pandemic by ethnicity were less than 10%; the number of non-White respondents was too small to make a valid inference in any case. The differences in age were also small between the Baby Boomer and Gen X cohorts on one hand—7%; however, it was in the reverse direction of what one might expect with younger faculty teaching online less prior to the pandemic. While several possible explanations are possible (e.g., more senior faculty have taught more and therefore had more opportunities to teach online or junior faculty are cautious about teaching online because of harsher assessments by online students), no evidence is adduced here about what exact reason was at play. A substantially larger percentage of female faculty than male had participated in online classes prior to the pandemic (14%). This is not as surprising as it once might have been since a recent study found substantially more digital learning leaders were female than male (Inside Higher Ed, 2020).

Table 3. Social influences

Question N = 172/173	Agree/ Strongly agree	Neither agree nor disagree	Disagree/ Strongly disagree	Total
Prior to the COVID-19 crisis, many of my colleagues in the <i>university</i> taught online.	42	25	33	100%
Since the COVID-19 crisis, many of my colleagues in the <i>university</i> are teaching online.	98	2	0	100%
Prior to the COVID-19 crisis, many of my colleagues in the <i>department</i> taught online.	42	13	44	100%
Since the COVID-19 crisis, many of my colleagues in the <i>department</i> are teaching online.	98	1	1	100%

Some rounding errors.

The findings in this section are simplified for ease of understanding. That is, similar questions with duplicative answers have been omitted. Qualitative (open-ended responses) provided useful insights and range of opinions for the researchers, but are not empirically categorized in the findings.

5.1. Social influences on adoption: leading and trailing aspects

Leading social influences are those that encourage one to look into a technology because one sees individuals who are respected using the technology or encouraging the use of the technology. Two sets of questions asked about whether respondents knew many colleagues who taught online by university and department, prior to and since the crisis. The departmental level question is below. While 42 percent agreed or strongly agreed with this statement at the departmental and university level prior to the crisis, 98% agreed with it after the crisis. Before the health crisis, faculty felt less commonality within their departments than within the university. See Table 3 below.

Table 4. Social influence concerns

Question N = 168	I have serious concerns that online teaching will be a new normal practice in the future.	I have serious concerns that my teaching style will be outdated if I am not teaching online.	I have serious concerns that my colleagues will think that I am less capable if I do not teach online.
Agree/Strongly agree	57	33	15
Neither agree nor disagree	23	24	25
Disagree/Strongly disagree	21	43	60
<i>Total</i>	101%	100%	100%

Some rounding errors.

Table 5. Voluntariness influences

Question N = 172	Agree/ Strongly agree	Neither agree nor disagree	Disagree/ Strongly disagree	Total (some rounding errors)
Prior to the -19 crisis, students seemed interested in having more classes online.	36	32	32	100%
Prior to the COVID-19 crisis, there was no pressure on me to teach online.	61	16	23	100%
Since the COVID-19 crisis, there has been pressure on me to teach online. (Reverse)	39	23	38	100%

The survey also inquired about faculty concerns regarding social comparisons (trailing social influences). Over half of the faculty had concerns that the temporary crisis would lead to a new normal. One-third felt the move to online education would leave them behind as instructors because of an outdated style. Fortunately, concerns about negative perceptions of colleagues were significantly less, but nonetheless 15% did indicate hesitation about this issue. See [Table 4](#) below.

5.2. Voluntariness effects on adoption

In terms of perceived demand, when asked if students seem interested in having more online courses prior to the COVID-19 crisis, it was only modestly more than one-third. Likewise, only 23% perceived strong pressure to teach online prior to the crisis. Since the crisis the pressure to teach online has increased, but it is notable that over half of the faculty do not feel strong pressure to teach online; qualitative comments suggest that this is because they willingly teach online and do not perceive pressure. See [Table 5](#) below.

Two-thirds of the respondents felt that they had not gotten incentives for teaching online courses. This indicates that incentive policies are ad hoc rather than consistently applied centrally. See [Table 6](#) below.

5.3. Performance expectancy effects on adoption

Performance is defined broadly here in line the technology adoption models. It includes perceptions of flexibility by faculty for themselves and their students which is invariably the single most powerful driver (when aligned with similar terms such as convenience) in the adoption of online education. It also includes satisfaction as a process/independent variable, rather than an outcome/

Table 6. Faculty incentives

Question: I do or have received incentives for teaching online classes.

N = 172	Percent of faculty
Agree/Strongly agree	33
Neither agree nor disagree	13
Disagree/Strongly disagree	54
<i>Total</i>	<i>100%</i>

Table 7. Performance expectancy influences

Question N = 172/173	Agree/ Strongly agree	Neither agree nor disagree (agree + neither)	Disagree/ Strongly disagree	Total (some rounding errors)
I believe that online teaching achieves an equal or greater sense of a <i>learning community</i> than face-to-face classes.	14	16	70	100%
I believe that online teaching is (would be) as <i>satisfying</i> for me as teaching face-to-face classes.	29	12	59	100%
I believe that online teaching achieves <i>knowledge outcomes</i> equal or greater than face-to-face classes.	30	19	51	100%
I believe that online teaching can provide equivalent or better <i>lecture presentations</i> than face-to-face classes.	32	23	45	100%
I believe that online teaching does as good or better job in helping students <i>reflect on and evaluate their learning</i> .	32	28	40	100%
I believe that online teaching does as good or better job in <i>helping students set learning goals</i> .	32	30	38	100%
I believe that online teaching can be as, or more, <i>successful</i> as face-to-face classes.	34	28	38	100%
I believe that online teaching can provide an equal or greater sense of <i>intellectual challenge</i> than face-to-face classes.	39	24	37	100%
I believe that online teaching can provide equal or better opportunities for students to <i>rehearse materials</i> than face-to-face classes.	39	38	24	101%

(Continued)

Table 7. (Continued)

Question N = 172/173	Agree/ Strongly agree	Neither agree nor disagree (agree + neither)	Disagree/ Strongly disagree	Total (some rounding errors)
I believe that the flexibility provided by online teaching is worthwhile for me.	62	20	18	100%
I believe that the flexibility provided by online teaching is worthwhile for students.	72	18	11	101%

dependent variable. The question asked is: in general, what is the degree of satisfaction you derive from online teaching (and how does that affect your preferences since satisfaction is frequently not the primary determinant in adoption)?

When the categories of strongly agree, agree, and neutral statements are tabulated, and 50% or more is the criterion for “acceptable” performance, eight items qualify. Faculty overwhelmingly feel that flexibility is positive, with acceptable ratings for students and themselves at 90 and 82% respectively. Rehearsal opportunities facilitated by online teaching formats are also perceived as acceptable (77%). Four items are in the 60% range in terms of acceptability. Faculty, on average, perceived intellectual challenge, helping students with learning goals, and helping students with learning reflection as more acceptable than not. An item intended to get a more holistic sense of performance, the evaluation of successfulness, was also in this range. The weakest item in the acceptable range was lecture presentations in online teaching, with a rating of 55%.

Table 8. Effort expectancy influences

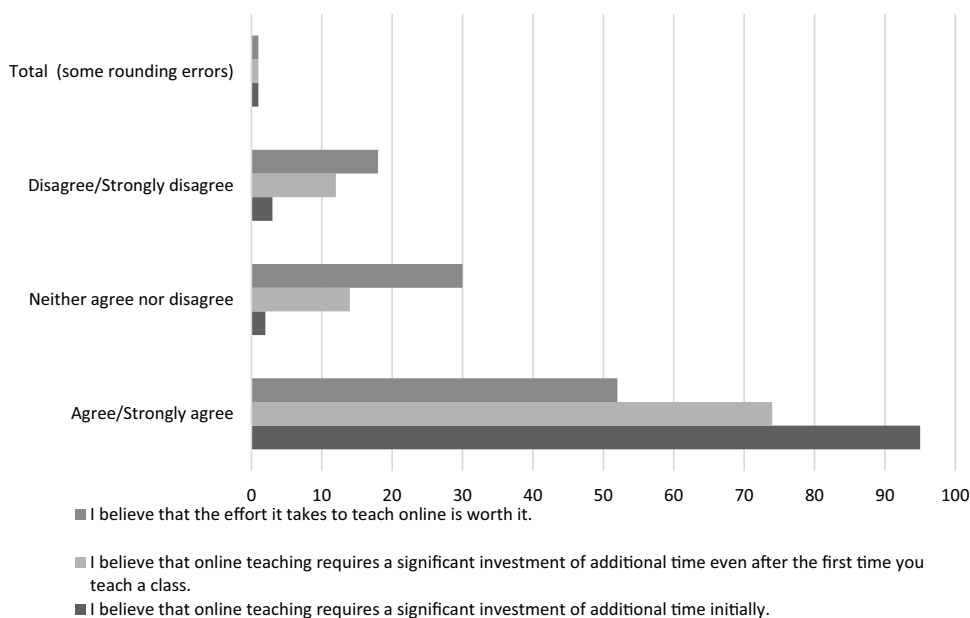


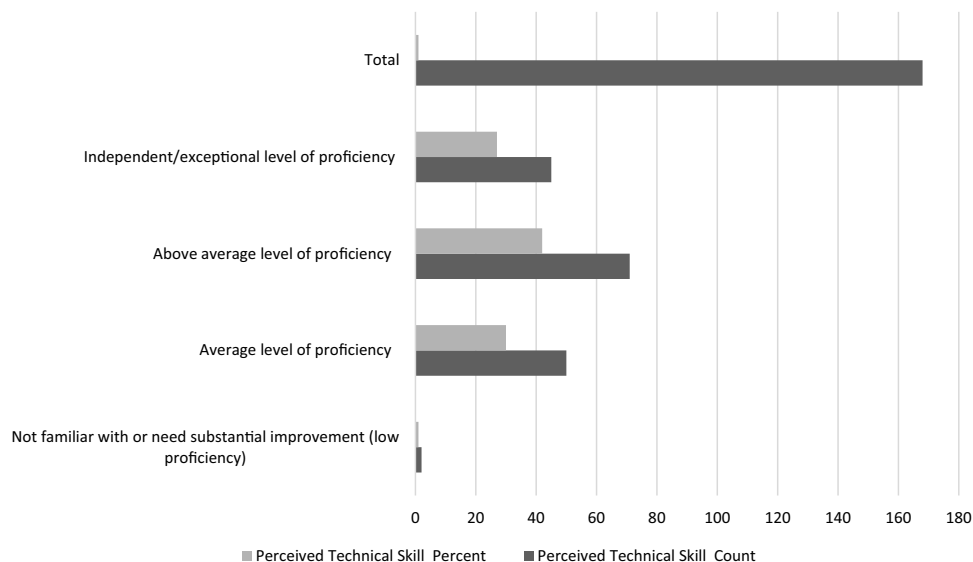
Table 9. Support influences

Question, (mean) N = 172/173	Agree/ Strongly agree	Neither agree nor disagree (agree + neither)	Disagree/ Strongly disagree	Total (some rounding errors)
<i>Prior to the COVID-19 crisis, good training was available about the learning platform at my campus</i>	86	10	4	100%
<i>Since the COVID-19 crisis, good training has been available about the learning platform at my campus.</i>	86	10	4	100%
<i>Prior to the COVID-19 crisis, customized training was available when I was building an online class.</i>	79	18	2	99%
<i>Since the COVID-19 crisis, customized training has been available when I am building an online course.</i>	80	14	5	99%
<i>Prior to the COVID-19 crisis, time and resources were allocated for me to learn about online teaching issues.</i>	75	15	10	100%
<i>Since the COVID-19 crisis, time and resources have been allocated for me to learn about online teaching issues.</i>	77	12	11	

When the items' disagree and strongly disagree categories are aggregated, and 50% is used for the criterion for concern with the performance of online teaching, three items qualify. A slight majority, 51%, are in disagreement about the equivalence of knowledge outcomes in online teaching. Similarly, 59% do not find online teaching as satisfying as face-to-face with 29% strongly disagreeing. By far the weakest parameter measured, however, was achieving a sense of a learning community, in which 70% disagreed that it could be equal or greater than in a face-to-face setting.

Pitting only those who agree and strongly agree against those who disagree and strongly disagree (and excluding the mid, "neither agree nor disagree" category altogether), provides a somewhat different picture. Using this comparison, more than half of faculty have concerns about online community, faculty satisfaction, knowledge outcomes, lecture presentations, student reflection, student learning goals, and overall success. More confidence than concern is only attained in intellectual challenge, rehearsal opportunities, and flexibility for students and faculty. See [Table 7](#) below.

Table 10. Perceived technical skill



5.4. Effort expectancy effects on adoption

The degree of effort is one area in which there is broad agreement among faculty. Online course development, maintenance, and time-on-teaching are generally considered more demanding than face-to-face courses. There is nearly universal agreement that online course development requires a significant investment of time (95% overall for respondents). There is also broad agreement that even after courses have been initially set up, the amount of time spent in teaching online continues to be greater than in face-to-face courses. How do faculty feel about this investment of time? Approximately half the respondents thought it was worth it in the end, 30% were neutral or resigned to the fact, but 18% did not feel the time spent in online teaching was worth it. See [Table 8](#) below.

5.5. Facilitative support effects on online adoption

Support for basic online training, customized training, and resources to support online teaching are all considered good at UNF. Perceptions about the level of training and support were constant before and after the advent of the COVID-19 crisis. Over the last decade, the university has invested in training faculty in pedagogy and technologies to enhance online teaching, more than quadrupling the staff assigned to this function and investing in technologies such as green-screens, video and audio studios, and extensive training in LMS. See [Table 9](#) below.

The strong inclination to have taken training has likely been a partial factor in the contribution to a relatively high level of self-perceived online teaching proficiency. In terms of “online technical skill (e.g., the use of Canvas),” only 1% rated themselves as low, 30% rated themselves as average, and 69% rated themselves as above or exceptional in proficiency. See [Table 10](#) below.

5.6. Resulting adoption intentions going forward

Despite performance challenges, faculty on average have strong resolve to move forward with online teaching. 71% agreed or strongly agreed that they will continue online teaching after the crisis is past, and 61% agreed that it would be more than prior to the crisis. Only 26% of the faculty felt that student feedback was poorer, with disagree or strongly disagree statements. See [Table 11](#) below.

Table 11. Faculty intention and student influence regarding teaching online

Level of agreement N = 166	I will continue to teach online classes in the future.	I intend to teach more classes in hybrid and online modes in the future.	Student feedback of my online classes is equal or better than that of my face-to- face classes.
Agree/Strongly agree	72	61	42
Neither agree nor disagree	16	21	32
Disagree/Strongly disagree	12	19	26
<i>Total*</i>	100%	101%	100%

*Some rounding errors

5.7. What are faculty perceptions of the strengths and weaknesses of online teaching after the initial COVID-19 onslaught at the case study institution?

One strength of the online environment at UNF is general support for teaching online. Only 4 to 10% disagreed with various elements of this issue. Second, and somewhat aligned, was a sense of relatively little pressure to teach online (only 23% felt some pressure prior to the crisis).

In terms of performance, one-third to slightly over one-half the faculty are neutral (neither agree nor disagree) or pleased (agree or strongly agree) with the various aspects of online teaching including

Table 12. UNF faculty adoption shifts: pre and during COVID-19, as well as future prospects*

Trends by adoption factors	Pre-COVID-19	During-COVID-19	Future Prospects
Social influence: colleagues (as positive models)	Low to moderate	N/A	Moderate
Social influence: colleagues (concerned with load-sharing)	Low	N/A	Moderate to high
Social influence: students	Moderate	N/A	Moderate to high
Pressure to teach online	Low	High	Moderate
Incentives to teach online	Low to moderate	Low	Moderate
Online teaching performance (perceptions by faculty)	Moderate	Moderate	Pressure to improve perceptions but also pressure on faculty to improve student perceptions of online quality
Ease of effort	Very low	Very low	Pressure to find ways to reduce effort
Level of support: training	High	High	Continued pressure for training; perhaps more appetite for longer training
Level of support: technical support	High	High	Pressure to expand customized support
Overall adoption trend	Increasing slowly but steadily	Radical but temporary increase	Likely beyond normal annual increases when voluntariness restored

*Low indicates lower likelihood of online adoption across the university and high indicates greater likelihood of online teaching adoption.

satisfaction, outcomes, rehearsal opportunities for students, and flexibility for faculty and students. This is in line with the U.S. literature.

Despite stronger than average facilitating conditions, when comparing online to face-to-face instruction, a quarter to 70% of respondents felt that online teaching was inferior in various ways. From the most concerning to the least they were: sense of learning community, faculty satisfaction, knowledge outcomes, lecture presentation, learning reflection, helping students set learning goals, overall success in teaching, intellectual challenge, and rehearsing materials.

Effort expectancies remained extremely high (negative). There was modest to weak data indicating incentives and reassign time mitigated these concerns, as well as concerns expressed about the need for more reassign time. Facilitating conditions were found to be good before and after the onset of the pandemic.

The interpretation of the level of concern by faculty depends heavily on:

- (1) whether the importance of high levels of acceptance is critical, such as during a pandemic or surges of student demand in specific areas;
- (2) the degree to which faculty choice is not a problem, allowing those uncomfortable with online to choose face-to-face options; and,
- (3) the degree to which an institution wants to create the most receptive environment for online education possible regardless of faculty choice issues.

Exaggerating for clarity, the results of the study are most concerning when all faculty must teach online, less troubling when faculty choice is maximized, and simply indicate substantial room for improvement in terms of the third perspective. Other than a slightly more positive attitude towards the university's technological and training supportiveness, the case study aligns with the Beta test and the general profile of universities described in the literature in U.S. institutions.

5.8. What are the likely shifts in faculty adoption perceptions before and after the pandemic?

When looking specifically at UNF's adoption trends, it seems probable that the long-term adoption rate will increase significantly after the cessation of restrictions. It seems reasonable that while pandemic pressures to increase online teaching decrease (due to reduced health concerns), other pressures will increase from the pre-pandemic context. Increasing adoption will likely be the following: increased social influence by colleagues and students, increased competence in teaching online, pressure to mitigate perceptions of excessive faculty effort in teaching online, and expectations of enhanced training and enhanced technical support. [Table 12](#) below identifies these trends.

6. Discussion and recommendations

6.1. What are the broad, long-term implications for higher education of the rapid, large-scale move to online teaching required by the pandemic?

The general profile of the data were consistent with other universities that already invested significant time and resources to assist and support faculty in teaching online and had a solid online teaching system in place, albeit much smaller in scale, prior to the pandemic. Given the literature, the extensive Beta testing, and the case study, we provide the following twenty observations.

6.1.1. Social influence

Because online teaching is growing, challenging, and resource intensive, universities are wise to make it a university-wide priority. The lack of top-level administrative planning and understanding

of online education was disappointingly obvious at many universities around the world at the beginning of the pandemic. Presidents, vice presidents, and deans need to be visible and supportive in overcoming challenges and improving quality.

In line with that strategy, online adoption can be enhanced by ensuring that faculty members teaching online are recognized for overcoming the inevitable challenges in achieving high quality, such as by providing teaching awards for excellence and innovation, as well as plentiful commendations for improvements and technical achievements. This is particularly important since student evaluations are typically slightly lower than face-to-face classes because of the physical presence bias in assessment by students. Junior faculty need recognition for the tenure review process and senior faculty need the encouragement to change long-term practices.

Another way to enhance social influence is to enhance the perceptions of department chairs. Chairs are either champions or hindrances because of their scheduling and leadership roles. Providing training and knowledge to them is likely to amplify their effort.

The pandemic illustrated that online planning was woeful at many universities or portions of universities. It is important to facilitate strategic planning of online teaching not only at the university level, but at the college and department levels as well. Such planning consciously examines the goals and strategies to match demands and challenges that are faced.

Yet another social influence strategy is to target specific online teaching projects at the department or college level, such as teams working on special challenges faced by departments (e.g., virtual labs or testing integrity), or a task force working on online teaching quality guidelines.

6.1.2. Voluntariness and incentives

An obvious way to increase adoption is to require that a certain portion of the curriculum is taught online, or that online options are available in certain programs where the critical mass will allow. Such steps do not necessarily have to include fully online asynchronous classes to provide better responsiveness to student demands and flexibility. The move to an increased proportion of hybrid classes and the use of synchronous virtual sessions can frequently provide sufficient flexibility while maintaining a rich educational experience.

So that a mandate to increase the percentage of online teaching is not perceived as an inflexible dictate, adoption can be enhanced by ensuring that faculty have and understand their choices among the online teaching strategies. Strategies can range from hybrid (partially face-to-face and partially online), asynchronous online, and synchronous online. Hybrid face-to-face and online strategies are often considered superior to either mode for learning achievement and satisfaction, but increase teaching complexity and scheduling, and offer less flexibility than fully online. Fully online but synchronous provides the opportunity for extensive virtual face-to-face and immediacy qualities, and requires the least preparation for lectures; however, it only offers physical flexibility, not temporal flexibility. Fully asynchronous classes provide both physical and temporal flexibility but require enormous preparation—especially lecture components—and customized feedback if they are to be considered high-quality by students. Faculty are more likely to adopt online approaches when they understand the interplay of factors and have institutional support for their preferences.

Faculty members are generally highly sensitive to the needs, preferences, and suggestions of students when presented high quality information. Surveying student preferences and making sure that data are reviewed by faculty can help adoption and provide motivation for continuous improvement.

Money does talk so providing incentives (e.g., professional development funds or stipends) to faculty for completing substantial training programs, for the initial design of a course, and/or for the redesign of a course is a powerful motivator when possible and appropriate.

6.1.3. Online teaching performance

As noted in this case study, many faculty have a variety of concerns about online teaching. Understanding these concerns is the first step in mitigating them in some cases, and occasionally transforming liabilities into assets. Therefore, providing regular faculty surveys that are broken down by discipline provides a concrete way of prioritizing improvement efforts.

A follow-up strategy is to investigate the foremost solutions to concerns in order to disseminate best practices by those who have been most successful in overcoming them, which also recognizes innovators.

Providing training that enhances active learning approaches is commonly considered a best practice because active learning is both well documented to improve learning outcomes, and is particularly well-suited to online teaching in which lecture is frequently reduced while learning activities are frequently increased.

Technology is part-and-parcel of online teaching, so providing training in the sophisticated use of the university's online learning platform, pros and cons of types of video production that can be used for lectures, and the features of commonly used videoconference technologies has a substantial effect on instructor confidence and teaching outcomes.

6.1.4. Ease of effort

This case study, echoing the literature, provides strong evidence that online teaching is nearly universally considered by faculty to be an enormous amount of additional work initially, and continues to be a lot of work thereafter. Providing reassign time for an initial course design is a common practice by universities trying to enhance and ensure online teaching quality.

All courses need to be redesigned from time-to-time because of content changes, but because of the rapid evolution of technology, online courses may need more frequent and extensive redesign efforts. Therefore, it is not uncommon to provide selective reassign times for well-documented redesign projects.

In the case of courses with many sections in which there are pre-recorded lecture and large question banks for student study, it is possible to divvy up the work among a group of faculty. This can provide both a higher quality and more comprehensive product that can be accessed by adjunct faculty as well.

6.1.5. Support for online teaching

While training is an obvious solution for the support of online teaching, the nature of such training is frequently not well understood. Different types of training provide different types of support, and providing a varied curriculum of training opportunities will likely enhance both quality of instruction and online teaching adoption by faculty. Ad hoc training seminars are excellent at tackling specific issues in bite-sized learning chunks, no matter whether it is a new technology or application, or a particular teaching strategy.

Longer-term training can occur when instructors are working on a specific course design, working with a course designer is common, and in some cases mandated by universities. This is essentially ongoing, one-on-one training that integrates technical design, curriculum design, and even pedagogical innovation.

Many universities provide an instructors' course or program of training over a semester or more for a cohort of faculty members, often coupled with either a reassign time or stipend. This is generally done with a single course per faculty member, and is generally only done once per instructor.

Finally, all universities today must ensure that their technology help desks are proficient and available for extended hours. This type of resource should be available not only to faculty, but to students as well so that many of the simple technical issues or momentary issues can be off-loaded to technicians rather than faculty members. This often entails outsourcing technology assistance off-hours to a purveyor specializing in such services.

Ultimately, the issue is about not only about increasing adoption, but fulfilling the promise offered by the provision of online education to the greatest degree possible (Bates, 2004). These recommendations are summarized in Appendix.

6.2. Usefulness of the Venkatesh model as a framework

The UTAUT model was used here as a framework rather than as a regression model because of the case study approach. The basic model was found to be relatively comprehensive of the faculty issues with some minor exceptions as noted in the open-ended survey responses such as faculty ownership of materials and encroachment on time for research because of the demands of online teaching.

6.3. Conclusion

Overall, the case study of a U.S. institution that had a supportive environment for online teaching demonstrates that faculty at such institutions:

- (1) varied extensively in their background, of whom a significant number of faculty had poor to relatively traumatic experiences,
- (2) were willing by-and-large to temporarily adjust to the dramatic needs of the time with fortitude,
- (3) nearly universally acknowledged learning a lot under adverse conditions when they had had little or no experience, and
- (4) acknowledged (on average) that they will probably need to teach more online in the future.

However, the case study also illustrates that:

- (1) there remains extensive concern with online teaching related to learning online community, faculty satisfaction, knowledge outcomes, lecture presentations, student reflection, student learning goals, overall success, and workload considerations,
- (2) while administrators are a primary component of enhancing faculty adoption and improving quality (e.g., providing teaching reassign time for new online courses), faculty must also endeavor to maximize the many advantages of online teaching as a series of tools and an approach, and actively seek to minimize challenges if significant improvement is to be made, and
- (3) it remains to be seen whether these concerns become fossilized or are reduced over time with exposure *and* implementation of better organizational initiatives than exercised in the past as reviewed in Table 13. Exposure alone without intervening actions is generally not shown to be a particularly effective change strategy (Axtell et al., 2002; Kroll & Pasha, 2021).

6.4. Study limitations

A pervasive issue for all case studies is generalizability. The authors have tried to provide a context for the strengths and weaknesses vis-à-vis other similarly-placed institutions via the literature and personal experience, but such placement is not quantitatively validated. Another limitation is the

collection of data at a single point in time when the experience of online education is evolving so rapidly. The authors have tried to mitigate this limitation by asking questions about prior and current experiences, as well as future intentions. Also, the authors have based their final, more expansive, recommendations on not only the case study, but the experience gleaned from the prior unpublished Beta test study and the literature on online teaching.

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Appendix Twenty Ways to Enhance Faculty Receptivity to Adoption of Online Teaching

Social Influence	<ul style="list-style-type: none"> • Ensure that the support of online teaching is a top university priority with visibility of top administrators • Offer various types of recognition including online teaching awards • Remind department heads to provide encouragement • Ensure university, college, and departmental strategic planning (to plan and improve online teaching over time) • Develop online teaching initiatives at the department and college level
Voluntariness	<ul style="list-style-type: none"> • Mandate online teaching sections and limit face-to-face sections to match student demand • Provide and explain faculty choice among online options • Survey students regarding interest and have faculty evaluate the data • Increase incentives for training and teaching online courses
Online Teaching Performance	<ul style="list-style-type: none"> • Identify and make efforts to address concerns of students and faculty related to online teaching as much as possible • Circulate best practice strategies regarding areas of concern • Provide training regarding the use of active learning in online environments • Provide training in technology used in online teaching
Ease of effort	<ul style="list-style-type: none"> • Provide reassign time for design of initial class • Provide reassign time for occasional redesign of online class • Foster group design efforts for commonly shared courses
Support in Utilizing Online Technology and Maintaining Online Courses	<ul style="list-style-type: none"> • Increase ad hoc training • Increase customized (one-on-one) training • Increase substantive training programs (e.g., semester long) • Ensure adequate just-in-time technology support



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