



The influence of organizational factors on the acceptance of online teaching among college faculty during the COVID-19 pandemic: a nationwide study in mainland China

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Abstract

The outbreak of the coronavirus disease 2019 (COVID-19) promoted online teaching on an unprecedented scale, raising researchers' attention to the importance of faculty's acceptance of this urgent teaching shift. This study aimed to explore the influence of organizational factors on faculty's acceptance of online teaching in terms of behavioral intention and perceived usefulness. A multilevel structural equation model was employed to analyze data on 209,058 faculty in 858 higher education institutions based on a nationwide survey conducted in mainland China. The results showed that three key organizational factors, namely strategic planning, leadership, and teaching quality monitoring, impacted faculty's acceptance of online teaching, although in different ways. Strategic planning had a direct impact on perceived usefulness, while leadership had a direct impact on behavioral intentions, and teaching quality monitoring had a direct impact on both perceived usefulness and behavioral intentions. In addition, an indirect effect was found between strategic planning and faculty's behavioral intentions through the mediation of the perceived usefulness of online teaching. The findings of this study have practical implications for college administrators and policymakers, which should effectively implement and promote online teaching and learning, and consider key organizational factors to increase faculty acceptance.

Keywords Online teaching · Organizational factors · Higher education · Behavioral intention · Perceived usefulness

Introduction

The rapid updating and reshuffling of modern information technologies continually informs and reforms the models of higher education. The issue of how to better cope with these reforms under varying conditions is a lasting challenge for higher education institutions. Online teaching has gained a wide attention in higher education, as it allows to deliver information and knowledge to faculty and students through both asynchronous and synchronous approaches, reducing temporal and geographic proximity constraints (Liaw & Huang, 2013). In particular, with the outbreak of the COVID-19 pandemic,

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online teaching has expanded dramatically to supplement, and partly supplant, face-to-face teaching in several countries. For example, under the initiative entitled ‘*Disrupted Classes, Undisrupted Learning*’ launched by the Chinese Ministry of Education on May 8, 2020, around 1,030,000 faculty have conducted 1,070,000 online courses for 17,750,000 students from 1,454 higher education institutions in China (Ministry of Education, 2020). Apparently, the prolonged pandemic and its impacts have changed the way we teach and learn (Yang et al., 2023). In fact, online teaching has played a critical role in providing flexible schooling to hundreds of millions of students at all levels from their homes (Huang et al., 2020). These changes are likely to continue beyond the pandemic. A nationwide survey including 600 million faculty and students of Chinese universities showed that over 80% of faculty were scheduled to conduct online teaching or blended teaching after the pandemic (Yang, 2020). Thus, online teaching has become a new form of education at the disposal of the majority of college faculty (Mishra et al., 2020), reflecting not only the internal demand for Chinese university development, but also a new trend in international higher education (Li & Dong-Lu, 2020; Pelletier et al., 2021). As a matter of fact, it is essential to make the existing education system more flexible, resilient, and enriching (Yang et al., 2020).

Faculty members play a primary role in designing, developing, delivering, and assessing online courses, and faculty’s acceptance of this type of teaching becomes an important issue for the sustainable shift towards, and development of, online teaching (Baber, 2021). A large percentage of faculty members have started to teach online for the first time due to the COVID-19 pandemic. Hence, the understanding of the faculty’s acceptance of online teaching is useful for the continued transformation of higher education in the future. Previous studies examined the factors influencing the acceptance of online teaching (Quadir & Zhou, 2021; Rivers, 2021; Watson & Rockinson-Szapkiw, 2021). These include mainly individual factors, such as motivation (Fathali & Okada, 2018), self-efficacy (Hsiao, 2012; Rivers, 2021), attitude (Hung & Jeng, 2013; Rivers, 2021), subjective norm (Alfadda & Mahdi, 2021), perceived control (Hung & Jeng, 2013) and ease of use (Sánchez-Prieto et al., 2017), satisfaction (Sihao et al., 2020), and technostress (Chou & Chou, 2021). However, the impact of factors related to the organizations where individuals work is less clear. In fact, the success of any large-scale transformative action is inseparable from organizational support (Naujokaitiene et al., 2015). Thus, higher education institutions, as organizations, play a critical role in the acceptance and promotion of online teaching by providing faculty with resources and support. So far, the few existing studies of organizational factors in online education focused on students’ perspectives. For example, Lee (2008) investigated the role of perceived resources (internal and external organizational factors) in students’ adoption of an online learning system. However, a systematic understanding of how organizational factors contribute to faculty’s acceptance of online teaching is still lacking. It would be harmful to the promotion and development of online teaching if college administrators and policymakers did not clearly know how key organizational factors influence faculty acceptance of online teaching.

To fill this research gap, in the context of online teaching during the COVID-19 pandemic in Chinese higher education institutions, the present study aimed to answer the following research question: What is the influence of key organizational factors on faculty’s acceptance of online teaching?

This study can help administrators and policymakers develop a better understanding of how organizational factors influence the effectiveness and performance of faculty in online teaching, and can provide insightful suggestions for decisions on how to promote and sustain faculty’s online teaching behaviors in China. Furthermore, it is hoped that this research

will be helpful to the design, development, implementation, and evaluation of similar large-scale organizational transformative initiatives in the future.

Related works

Faculty's acceptance of online teaching

Faculty's acceptance of online teaching was always investigated from the point of view of behavioral intention. Several theories, such as the technology acceptance model, the unified theory of the acceptance and use of technology, the theory of planned behavior, and the integrative model of behavior prediction, have been widely applied to explain the factors contributing to behavioral intention (Davis, 1989; Kreijns et al., 2013; Venkatesh et al., 2003). Based on these theories, behavioral intention for online teaching can be defined as the extent to which faculty tend to be willing to conduct online classes, and is always followed by actual action. Moreover, a strand of literature argued that faculty behavioral intention for online teaching is associated with a complex set of factors, such as perceived usefulness, attitude, subjective norms, and self-efficacy (Alkinani, 2021; Chou & Chou, 2021; Lai et al., 2018; Sihao et al., 2020).

Among these factors, perceived usefulness is one of the most influential factors in explaining behavioral intention (Davis, 1989; Sihao et al., 2020; Zulfiqar et al., 2021). Perceived usefulness refers to "the degree to which faculty believe that using online teaching would enhance students' academic performance" (Davis, 1989). The strong association of perceived usefulness with behavioral intention has been empirically demonstrated in various conditions (Al-alak & Alnawas, 2011; Baber, 2021; Davis, 1989; Venkatesh et al., 2003); it can be explained by the view that individual behaviors are generally reinforced for good performance through promotions, raises, or other rewards (Sherif & Sherif, 1967). In addition, perceived usefulness showed to play a mediating role in the relationship between some external variables (e.g., knowledge application and perceived ease of use) and behavioral intention (Yang et al., 2019; Sánchez-Prieto et al., 2017; Zulfiqar et al., 2021).

Organizational factors of online teaching

Operational attributes, processes, or conditions within an organization can be considered as organizational influencing factors (Valaitis et al., 2018). A variety of organizational factors exist, usually including "structure and philosophy, team resources and administrative support, as well as communication and coordination mechanisms" (San Martín-Rodríguez et al., 2005). Although little research has assayed the influence of organizational factors on faculty's acceptance of online teaching, previous studies identified three main factors related to faculty's perception and intention toward pedagogical change: strategic planning, leadership, and teaching quality monitoring.

Strategic planning

Strategic planning refers to the development of an organization-wide plan that, once implemented, will ensure a full function to achieve organizational goals (McLaughlin-Graham & Berge, 2005). Regarding online teaching, strategic planning can be interpreted as the organizational process of developing and maintaining a strategic fit between an organization and

the current online teaching environment (Kotler & Murphy, 1981); as such, it is a proactive choice to cope with the opportunities and challenges from the COVID-19 pandemic. In general, strategic planning includes the fundamental aspects of organizational policies and decisions, such as goals and objectives, resource allocation, management, and legislation (Hu et al., 2018). Strategic planning is vital for organizations to enhance their adaptability to the current environment through innovative strategies and professional academic management, especially in a period of change or crisis. In addition, it can provide organizational leaders and faculty with a shared understanding of online teaching, and direct their efforts towards the realization of their academic goals.

Hu et al. (2018) made a survey of Chinese strategic planning in higher education institutions. They found that the majority of higher education institutions had a positive view of strategic planning, regarding it as an appropriate instrument to attract and integrate resources. In addition, some differences in strategic planning texts were found among higher education institutions at different levels and of different types. These differences may suggest diverse influences on their faculty, which provide a reference for our study to explore the effects of strategic planning on faculty's perceived usefulness of online teaching. Organizational planning enables faculty to make the most of time, resources, materials, and techniques (Chickering & Ehrmann, 1996), which in turn makes an important contribution to teaching effectiveness. In addition, strategic planning provides faculty with structured organizational goals, which have been linked to faculty teaching practices, experience, and job satisfaction (Shim et al., 2013; Skaalvik & Skaalvik, 2017).

Leadership

In this study, leadership refers to the ability of organizational top leaders to guide faculty and students towards the fulfillment of academic goals and objectives. Effective leadership is vital to the success of online teaching, as leaders are in the chairs of power and mobilize the human, social, and financial resources to build strong linkages across organizational sectors to support the online teaching by faculty of students at the frontline (Schleicher, 2018). As indicated by Aruzie et al. (2018), the effects of leadership are considerably greater in more difficult situations than in normal times. Given the large-scale and compulsory features of online teaching during the COVID-19 pandemic, leadership may have had a greater influence on online teaching performance than in normal times. Therefore, the present study focused on the influence of leadership on faculty's online teaching.

Previous studies showed that organizational leadership has a positive influence on teachers' self-efficacy (Tahsildar, 2021), which in turn is an antecedent variable of perceived usefulness and behavioral intention (Hsiao, 2012; Rivers, 2021). Thus, it is possible that leadership may play a critical role in faculty's perceived usefulness of and behavioral intention towards, online teaching.

Teaching quality monitoring

Teaching quality monitoring focuses on the management of the online teaching process through proper techniques, so that online teaching operates as expected towards the realization of its objectives (Mourato & Patrício, 2019). Ensuring teaching quality is a fundamental goal and the main aspect of teaching management (Huang et al., 2021). According to existing studies on industrial quality control processes, paying attention to

the process can ensure not only that variation in online teaching is kept within acceptable bounds, but also the smoothness of the online teaching process (Zhang et al., 2000).

The utilization of learning management systems is a general measure adopted by organizations to monitor and improve teaching quality in higher education institutions (Chaubey & Bhattacharya, 2015). These systems allow organizations to easily employ advanced functions and techniques based on information and communication technology (ICT) to provide online educational services for students, faculty, and managers, thereby helping faculty make online teaching more enhanced, efficient, flexible, and powerful (Aldiab et al., 2019). For example, through learning management systems, faculty can check student assignments online, helping them to better and more quickly acquire information on the degree to which students have mastered teaching content (Richards-Babb et al., 2011). In addition, as a typical measure of teaching quality monitoring, school inspection can provide clear feedback and advice to teachers, which can result in improvements in their work performance (Matete, 2009).

The relational model and hypotheses

Based on our review of earlier studies, we predicted that organizational factors can play a significant role in affecting faculty's acceptance of online teaching, including both perceived usefulness and behavioral intention. Therefore, as shown in Fig. 1, we postulated that organizational factors, including strategic planning, leadership, and teaching quality monitoring, play a significant role in faculty's perception of the usefulness of, and behavioral intention towards, online teaching. In addition, in this study, the relationship between perceived usefulness and behavioral intention, as well as the mediating role of perceived usefulness on the relationship between organizational factors and behavioral intention, were also examined. The specific hypotheses advanced are as follows:

Hypothesis 1 (H1) Strategic planning is positively related to faculty's perceived usefulness of online teaching.

Hypothesis 2 (H2) Leadership is positively related to faculty's perceived usefulness of online teaching.

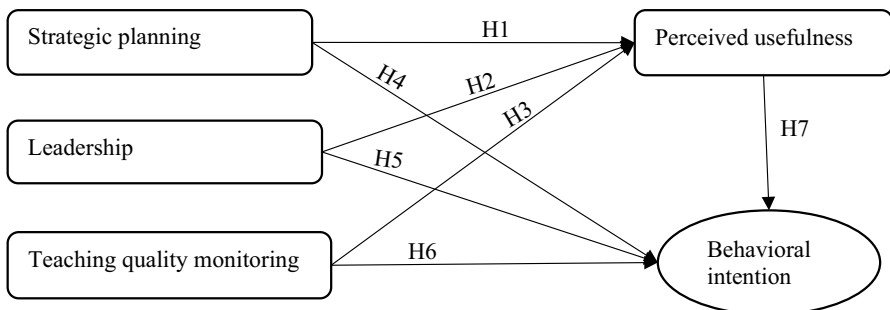


Fig. 1 The proposed rational model of organizational factors, perceived usefulness, and behavioral intention

Hypothesis 3 (H3) Teaching quality monitoring is positively related to faculty's perceived usefulness of online teaching.

Hypothesis 4 (H4) Strategic planning is positively related to the level of faculty's behavioral intention towards online teaching.

Hypothesis 5 (H5) Leadership is positively related to faculty's behavioral intention towards online teaching.

Hypothesis 6 (H6) Teaching quality monitoring is positively related to faculty's behavioral intention towards online teaching.

Hypothesis 7 (H7) Perceived usefulness is positively related to faculty's behavioral intention towards online teaching.

Methods

To examine our hypotheses, a part of the necessary data was taken from a Chinese nationwide survey entitled "A Survey on the Implementation of Online Teaching for All Colleges and Universities." Conducted by the Chinese Ministry of Education, this survey aimed to assess the implementation of online teaching comprehensively in colleges and universities during the COVID-19 pandemic. In order to collect information about organizational support and service in online teaching, the heads of the academic affairs offices were required to answer the items of the organizational questionnaire, covering questions on factors of strategic planning, leadership, and teaching quality monitoring. In parallel, faculty were asked to fill in the items in the faculty questionnaires about their experience, opinions, and actual implementation of online teaching during the COVID-19 pandemic, covering behavioral intention and perceived usefulness.

The survey took place between July 10 and 17, 2020, and involved all 31 top-level administrative divisions of mainland China. First, the survey notice was delivered to organizations by the government departments of education. Then, an email from the organizational academic affairs office was sent to the heads of the academic affairs offices and to at least 35% of the faculty, with an invitation to participate. This email explained the objectives, procedures, and content of the study, and provided a web link and a QR code to access the questionnaire. Before clicking on the survey link, participants were provided information about the study and gave their informed consent to participate. An email and telephone number were included to answer any doubts or questions about the online questionnaires. This study complied with the basic principles of the Helsinki Declaration, with an emphasis on the anonymity of the data collected, confidentiality, and non-discrimination among participants.

Participants

A total of 1,036 higher education institutions nationwide that employed online teaching during the COVID-19 pandemic, were identified and selected for the survey by the Chinese Ministry of Education. About 248,000 faculty members from these institutions were included in this survey. The questionnaires collected from institutions with fewer than 10

faculty responses were excluded to ensure an adequate and representative sample size and to mitigate potential bias. Additionally, faculty responses with blank or completely inaccurate questionnaires were eliminated. As a result, a total of 209,058 faculty from 858 organizations were included in this study, with a response rate of 84.29% and 82.82% for the faculty questionnaire and the organizational questionnaire, respectively. Therefore, these samples were largely representative of the higher education institutions and faculty in China who have adopted online teaching during the COVID-19 pandemic. Regarding faculty demographic information, about 40.94% ($N=85,590$) were male. The majority (71.50%, $N=149,467$) were aged between 30 and 50; about 13.35% ($N=27,920$) and 15.15% ($N=31,671$) were young faculty aged below 30 and elder faculty aged above 50, respectively. This is consistent with the present age and gender distribution of higher education faculty in China (Liu & Li, 2020).

Measures

Behavioral intention

Three items, taken from existing scales of behavioral intention for ICT use (Chen & Wu, 2020; Macedo, 2017), were modified to examine faculty's behavioral intention towards online teaching during the COVID-19 pandemic (e.g., "I plan to continue online teaching after the lockdown"). These items were measured using a five-point Likert scale, with 0 = strongly disagree, 1 = moderately disagree, 2 = neutral, 3 = moderately agree, and 4 = strongly agree. The values of the composite reliability and average variance extracted were .59 and .81, respectively, suggesting a good convergent validity, while Cronbach's α value was .80, indicating good reliability. The mean score of these three items was used to indicate the faculty's behavioral intention, where a higher score would indicate a more positive intention.

Perceived usefulness

Perceived usefulness was measured using one item ("Compared to offline learning, what do you think was the effect of online learning/teaching during the COVID-19 pandemic period?"). Faculty were required to answer this question using a 5-point Likert scale, with 0 = offline teaching is much better, 1 = offline teaching is slightly better, 2 = the effectiveness of online teaching is equal to that of offline teaching, 3 = online teaching is somewhat better, and 4 = online teaching is much better. A higher score would indicate a higher level of faculty's perceived usefulness.

Organizational factors Organizational factors were measured by asking a series of questions via the organizational questionnaire, developed by an expert group within the Ministry of Education and included in the nationwide survey. The head of academic affairs of each organization was asked to reply to each question as the representative of that organization. The sample items for strategic planning were as follows: *Which of the following topics were included in your organizational strategic planning about online teaching and learning? (a) The vision and mission statement; (b) Specific measurable, achievable, relevant, and time-bound goals; (c) Human, financial, and material resources management; (d) Periodic reviews of the process.* The sample items for leadership were as follows: *What is the position of the head of the online teaching manage-*

ment team in your institution? 4=Leader at the university level; 3=Leader at college/school level; 2=Leader at the department level; 1=Other. The sample items for teaching quality monitoring were as follows: Which of the following measures were adopted in your university/college/research institution? (a) Monitoring the effectiveness of students' learning via data analysis techniques; (b) Inspecting the actual implementation of the online teaching-learning process; (c) Checking students' online course assignments. The scores across each question item were summed and used for model analysis. Higher scores in organizational factors would indicate better organizational support and service for online teaching.

Data analysis procedures

R (version 3.6; R Core Team, 2019) was used to transform, clean, and calculate the original survey data for modeling analysis. The basic descriptive statistics of the variables included in this study, were calculated using the *psych* package (version 2.1.3; Revelle, 2019). Since faculty are nested within organizations, biased estimates may occur due to the violation of independence assumptions (Peugh, 2010; Raudenbush & Bryk, 2002). Therefore, a multilevel structural equation model (MSEM) was used in the present study to examine the influence of organizational factors on faculty's acceptance of online teaching. This MSEM combines the modeling approaches of multilevel modeling and structural equation modeling to overcome the limitations of each, by facilitating the analysis of multiple dependent variables (i.e., perceived usefulness and behavioral intention) in nested data (as faculty are nested in organizations by nature; Lee et al., 2018). Faculty's perceived usefulness and behavioral intention are variables at level 1 (i.e., faculty level), while organizational factors are variables at level 2 (i.e., organizational level). The MSEM was conducted via the *lavaan* package (version 0.6-8; Rosseel, 2012), which is a free, open-source, commercial-quality package for multivariate statistical models. The missing values were deleted listwise.

Results

The descriptive statistics and bivariate correlations of the variables included in the present study were first described; then, the interclass correlations of behavioral intention were examined to show how much variance of behavioral intention could be explained by the organizational factors, which justifies the MSEM. Before exploring the path coefficients of the MSEM, the model fit indices were used to test the fit of the proposed model to our data. Then, the specific influences of organizational factors on perceived usefulness and behavioral intention were analyzed via path coefficients paired with a 95% confidence interval (95% CI) and R^2 . In addition, the indirect influences of organizational factors on behavioral intention were also examined using coefficients and 95% CI (Preacher & Hayes, 2008).

Descriptive statistics

Table 1 presents the descriptive statistics and the correlations among the variables included in the present study. As shown in Table 1, all organizational factors were

Table 1 Descriptive statistics and correlations between variables related to faculty (N = 209,058)

	Mean	SD	1	2	3	4
1. Strategic planning	3.28	.94	1			
2. Leadership	3.48	.66	.15	1		
3. Teaching quality monitoring	3.21	.80	.27	.17	1	
4. Perceived usefulness	1.69	.14	.10	.02	.10	1
5. Behavioral intention	2.97	.14	.09	.09	.14	.51

All correlations were significant at $p < .05$

significantly related to faculty's perceived usefulness of, and behavioral intention towards, online teaching.

Interclass correlation (ICC)

To answer the main research question of this study (*What are the influences of organizational factors on faculty's acceptance of online teaching?*), the first step was to ensure that differences in faculty's acceptance of online teaching exist across organizations. To achieve this goal, a null model that included no predicted factors was tested to calculate the interclass correlation (ICC). In the current study, the value of ICC was .034, which indicates that about 3.4% of behavioral intention variance was accounted for by organizational-level factors. While some studies indicated that multilevel analysis should be used for ICC values that exceed .058, due to the non-negligible variance explained by organizational-level factors (Cohen, 1977), others suggested that multilevel analysis should be used when the research question meets the nested nature of whether the ICC meets the requirements. In this study, multilevel analysis was employed regardless.

Model fit indices

Model fit analysis was performed to validate the MSEM before examining the path coefficients. As χ^2 is sensitive to sample size, the following additional indices were considered to indicate the fit of the model to survey data: the comparative fit index (CFI); the Tucker-Lewis index (TLI); the root-mean-square error of approximation (RMSEA); and the sum of root-mean residuals (SRMR). Values above .90 in CFI and TLI, and values lower than .08 in RMSEA and SRMR, indicate a good fit (Hu & Bentler, 1999). The results, presented in Table 2, indicate that all the goodness-of-fit indicators surpassed the recommended values. This suggested that the model had a good fit to the survey data, was robust, and could be

Table 2 Model fit indices of the MSEM

Model	χ^2	df	CFI	TLI	RMSEA	SRMR_w	SRMR_b
MSEM	16,339.303	20	.966	.940	.054	.044	.058
RV			.900	.900	.080	.050	.050

df degree of freedom, *CFI* comparative fit index, *TLI* Tucker–Lewis index, *RMSEA* root-mean-square error of approximation, *SRMR_w* sum of root-mean residuals at within (faculty) level, *SRMR_b* sum of root-mean residuals at between (university) level, *RV* recommended values

employed to explore the association of organizational factors with faculty's perceived usefulness of, and behavioral intention towards, online teaching.

Path coefficients analysis

Path coefficients (β values), the 95% confidence interval (95% CI) of the path coefficient, and the R^2 values of the model were used to test the proposed hypotheses. The size of the path coefficient indicates the amount of change in faculty's acceptance of online teaching (i.e., perceived usefulness or behavioral intention), with a one-unit increase of the organizational factor when holding all other relevant variables constant. The path coefficient informs about the direct effect of predictors (i.e., organizational factors) on the outcome variables (i.e., faculty's acceptance of online teaching; Wright, 1934). The 95% CI of the path coefficient would tell us how accurately this path coefficient was estimated. It is a range of values (upper and lower) that we can be 95% certain that it contains the true path coefficient of the population (du Prel et al., 2009). A small 95% CI of a coefficient would indicate that this coefficient was calculated quite accurately, and that it can represent its true value. In parallel, a 95% CI containing 0 would mean that probably, the organizational factor was not really related to the faculty's acceptance of online teaching. In the other cases, the path coefficient would indicate a significant impact of the organizational factor on the faculty's acceptance of online teaching. The value of R^2 indicated how well the data fit the model and informed us that the proportion of variance in faculty's acceptance of online teaching could be accounted for by the predictors (i.e., organizational factors and covariates) in the model (Moore et al., 2013). Since the present study mainly focused on the influences of organizational factors on the acceptance of online teaching, only the MSEM path modeling estimations at the organizational level were shown in Fig. 2.

The results supported H1, H3, H5, H6, and H7, while H2 and H4 were rejected. Strategic planning ($\beta = .011, p = .059, 95\% \text{ CI} = [-.000, .023]$) and teaching quality monitoring ($\beta = .024, p < .01, 95\% \text{ CI} = [.008, .041]$) were found to be positively related to perceived usefulness, collectively accounting for 2.4% variance of faculty-perceived usefulness.

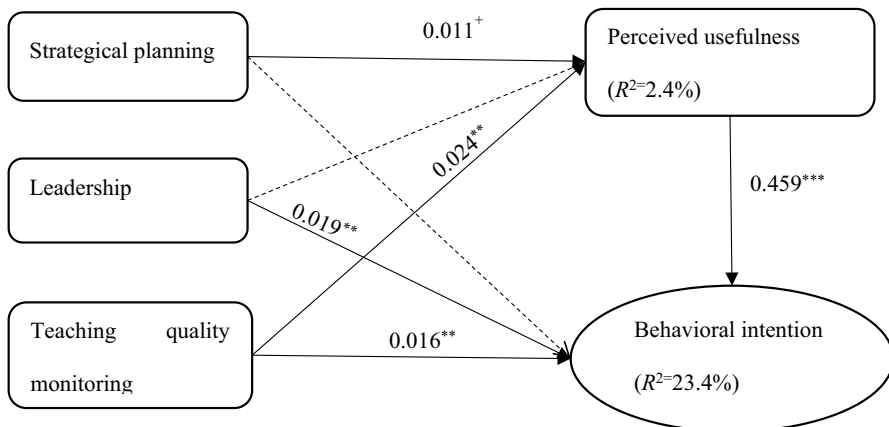


Fig. 2 Influence of organizational factors on faculty's acceptance of online teaching. *** $p < .001$; ** $p < .01$; * $p < .05$, + $p < .10$. The solid arrows indicate where effects exist; the dotted arrows indicate where no effects exist

Moreover, leadership ($\beta = -.005$, $p = .536$, 95% CI = $[-.020, .011]$) was not significantly related to perceived usefulness.

In terms of influence on behavioral intention, leadership ($\beta = .019$, $p < .01$, 95% CI = $[-.005, .033]$), teaching quality monitoring ($\beta = .016$, $p < .05$, 95% CI = $[-.001, .031]$) and perceived usefulness ($\beta = .459$, $p < .001$, 95% CI = $[-.373, .546]$) were found to be positively related to behavioral intention, collectively accounting for a total of 23.4% variance of faculty's behavioral intention, while no significant influence was found between strategic planning ($\beta = .003$, $p = .599$, 95% CI = $[-.008, .013]$) and behavioral intention.

Strategic planning and teaching quality monitoring were found to have a significant influence on perceived usefulness, and the latter was found to have a significant influence on behavioral intention; thus, there may be some indirect influences of strategic planning and teaching quality monitoring on behavioral intention via the mediation of perceived usefulness. These indirect effects were examined using the path coefficients and 95% CI. As shown in Table 3, the indirect effect of teaching quality monitoring was .011 with a 95% CI $[-.003, .019]$, which does not straddle a zero in-between, thereby demonstrating the existence of a mediation. Similarly, the indirect effect of leadership was .005 ($.011 \times .459$) with a 95% CI of $[-.000, .011]$, thereby marginally demonstrating the existence of a mediation.

Discussion

The shift from conventional teaching to diversified and flexible teaching (i.e., online teaching) has become an inexorable trend in higher education. No educational transformative action can be successfully carried out without organizational support. Hence, to better address this challenge, organizations also need to be transformed to better support online teaching. This study examined how organizational factors, including strategic planning, leadership, and teaching quality monitoring, influence faculty's acceptance of online teaching in terms of perceived usefulness and behavioral intention. By drawing data from a nationwide survey in mainland China, this study found that teaching quality monitoring had the strongest association with faculty's acceptance of online teaching via the direct positive influence on both behavioral intention and perceived usefulness. Moreover, it was found that leadership benefited faculty's acceptance of online teaching, with a direct influence on behavioral intention; and that strategic planning contributed to faculty's acceptance of online teaching through the mediation of perceived usefulness, which in turn enhanced behavioral intention. These findings can provide insightful implications for college administrators and policymakers to design, develop, implement, and evaluate large-scale organizational transformative initiatives in the future.

Table 3 Direct and indirect effects of organizational factors on faculty's behavioral intention

	Direct effect		Indirect effect	
	Amount	95% CI	Amount	95% CI
Strategic planning	–		.005 ⁺	$[-.000, .011]$
Leadership	.019**	$[-.005, .033]$	–	
Teaching quality monitoring	.016*	$[-.001, .031]$.011**	$[-.003, .019]$

** $p < .01$; * $p < .05$, + $p < .10$

This study revealed that teaching quality monitoring is the most influential variable affecting faculty's acceptance of online teaching, which in turn has direct positive influences on both faculty's perceived usefulness of, and behavioral intention toward, online teaching. Furthermore, perceived usefulness was found to play a mediating role in the relationship between teaching quality monitoring and behavioral intention. This result may be explained by the fact that the primary goal of teaching is for faculty to help students learn, and ensure that meaningful learning occurs (Faremi, 2014; Wong, 1995). Faculty pursues monitoring activities to keep track of students' learning, so as to make instructional decisions and provide feedback to students on their progress (Cotton, 1988). Thus, the enhancement of teaching quality monitoring will positively affect the faculty's perceived usefulness and behavioral intention. Compared to traditional classroom teaching, in online teaching much of the teaching quality monitoring is shifted from in-person to the online learning environment. Therefore, when encouraging faculty to embrace online teaching, college administrators and policymakers should consider the following actions: (1) ensure that the adopted online learning management system and related technological tools can support faculty to conduct teaching quality monitoring activities. These include, among others: communicating with students and checking their understanding during online learning; distributing, collecting, correcting, and grading students' assignments; and tracing, analyzing, and reviewing student performance data (Cotton, 1988); (2) organize technology training workshops and experience sharing sessions for faculty to master online technology tools and learn practical teaching strategies, so that they can perform a smooth transition from traditional classroom teaching to online teaching (Huang et al., 2020); and (3) provide faculty with timely technical support and service to prevent online teaching from being disrupted or paused (Huang et al., 2020).

In this study, leadership was found to have a positive direct effect on faculty's behavioral intention for online teaching. This result is in accord with previous research, which showed that effective leadership can build a healthier work environment and empower faculty to conduct the planned actions (Arenas et al., 2009; Meng & Sun, 2019). This is also consistent with a recent survey of faculty's opinions on their development of expertise in teaching, which demonstrated that leadership plays a critical positive role, as working under good leaders enables faculty to perform in their best manner and deal with tough situations in a more composed way (Ziyadin et al., 2018). A campus-wide transformation of teaching models is a very complex and challenging process, which needs transformational, visionary leadership. The findings of this study imply that top-level leaders can coordinate relations across sectors and provide strong support in terms of personnel, resources, and technology for the implementation of online teaching; this can reduce faculty's resistance to technology and boost their behavioral intention for online teaching (McBride, 2010). However, the present study did not find a statistically significant influence of leadership on the faculty's perceived usefulness of online teaching. It may be that the present study considered only the positions of the leaders and did not specify their roles and responsibilities. In fact, this study found that seven strategic areas of leadership can lead to greater faculty's acceptance of online teaching: (1) collaboration; (2) communication; (3) needs-based, relevant, and product-oriented training; (4) creating a powerful and focused coalition; (5) understanding culture; (6) articulating a shared vision; and (7) dealing with obstructions (McBride, 2010). It is worthwhile to explore in future research whether, and which of, these seven strategic areas of organizational leadership will influence the faculty's perceived usefulness of online teaching.

Strategic planning was found to directly influence perceived usefulness; this indicates that a strategic planning that takes the external environment into account, encourages

optimization and resource vitality, builds ties to budgeting, and includes evaluation (Tan, 1990), could be beneficial to the transformation of teaching in higher education and have a direct positive impact on faculty's perceived usefulness of online teaching. This may be explained by the fact that strategic planning describes clearly not only the goals of online teaching, but also specific ways toward these goals (Bryson, 2011); this can help faculty clearly understand what should be taught and how (Locke & Latham, 2002). This understanding facilitates their achievement of control over the teaching process and contributes to the achievement of academic goals, which enhances their perception of the usefulness of online teaching (Löfström & Nevgi, 2007). This study further found that strategic planning also had an indirect effect on faculty's behavioral intention towards online learning through the mediation of their perception of its usefulness, which is consistent with prior studies on external factors in behavioral intention (Fathali & Okada, 2018; Zulfiqar et al., 2021). However, strategic planning was not found to directly influence faculty's behavior intention towards online teaching. A possible explanation for this result may be the lack of faculty's involvement in the process of strategic planning during the COVID-19 crisis, which may have led strategic planning to fail boosting faculty's behavioral intention towards online teaching. Thus, it can be suggested that the involvement of faculty in the process of making strategic planning may be a valid measure to enhance faculty's behavioral intention towards online teaching. While preliminary, this finding suggests: (1) the development of sound strategic planning before the actual implementation of online teaching; to this respect, strategic planning should clarify the basic requirements and practical guidelines of online teaching, so as to improve faculty's acceptance of online teaching; and (2) the engagement of all stakeholders in the development of a strategic planning process; to this respect, faculty, as well as college administrators and policymakers, should focus on the same priorities and pathways for improvement, again so as to promote faculty's acceptance of online teaching.

Limitations and future research

Despite its important implications for educational practice, this study has two main limitations. First, organizational factors supporting online teaching are a complex system; however, the present study included only three key factors, rather than a complete list of factors, excluding other organizational factors (e.g., organizational culture and climate) which should be explored in the future. Second, the findings of the present study were based on a nationwide survey in mainland China; thus, further research should focus on the generalization and application of these findings to countries or regions with notable differences in the culture or educational management philosophy from China.

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Data availability The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interests The authors have no competing interests to declare that are relevant to the content of this article. And all the authors agreed to submit the manuscript to *Educational technology research and development*.

Ethical approval This study was reviewed approved for ethical standards by the Central China Normal University Institutional Review Board.

Consent to participate Written informed consent was obtained from the students.

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