Collaboration, Connection, and Culture: Understanding the Impact of Institutional Culture on Online Teaching in Higher Education

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Abstract

Teaching and learning online is an increasingly important aspect of higher education, especially post-COVID-19. Previous studies have demonstrated the importance of Technological Pedagogical Content Knowledge (TPACK) for effective online teaching. However, the contextual factors impacting TPACK have not been adequately explored. The purpose of this quantitative study was to determine if the contextual factor of institutional culture impacts TPACK among online higher education faculty at institutions in the southeastern United States as well as to what extent specific dimensions of institutional culture affect TPACK levels. Data were collected using an anonymous online survey that was shared with potential participants through email and social media. Data were analyzed using a multiple linear regression model to determine significance between the independent variables, the seven dimensions of institutional culture, and the dependent variable, TPACK. Results indicated that significance was found between two individual elements of institutional culture and TPACK: (1) collaboration and team learning and (2) connection between the organization and its environment. These findings indicate that higher education administrators should focus efforts on creating opportunities for faculty to engage in professional development and move beyond siloed work to collaborative projects. Administrators should also ensure that the institution is connected to the local, regional, and global community through aligned institutional goals with the needs of the community and establishing opportunities for faculty to connect globally. Future research should focus on exploring the relationship between specific aspects of institutional culture that may impact quality online teaching.

Keywords: institutional culture, online teaching, faculty, administrators, TPACK

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As online education continues to increase in today's academic environment (Lee & Tsai, 2010; Northcote et al., 2015; Roman et al., 2010), teaching looks much different than it did when all students sat at desks in a lecture hall. Online instructors must not only have a general knowledge about how to teach, but they must also have knowledge of the various technologies available to them, how to use them, and which are most appropriate for use in specific contexts, in addition to juggling many more roles than the traditional, face-to-face instructor (Mishra & Koehler, 2006; Martin et al., 2021). The technological pedagogical content knowledge (TPACK) framework examines the interplay of each type of knowledge necessary for effective teaching in an online environment (Mishra & Koehler, 2006). The contexts surrounding the teaching environment also influence how effectively instructors are able to synthesize technological, pedagogical, and content knowledge (Brianza et al., 2022; Mishra, 2019). A context that has not been adequately explored as is impacts TPACK is institutional culture (Brianza et al., 2022). Institutional culture is socially constructed and refers to the share values and beliefs of the stakeholders of the institution (Tierney & Lanford, 2018; Khan et al., 2020). The purpose of this study was to determine if the contextual factor of institutional culture impacts TPACK among higher education faculty at institutions in the southeastern United States as well as to what extent specific dimensions of institutional culture affect TPACK levels.

Literature Review

The following sections focus on literature examining the development of TPACK and its evolution in the last twenty years. Institutional culture is also discussed related to why it is an important contextual factor in higher education.

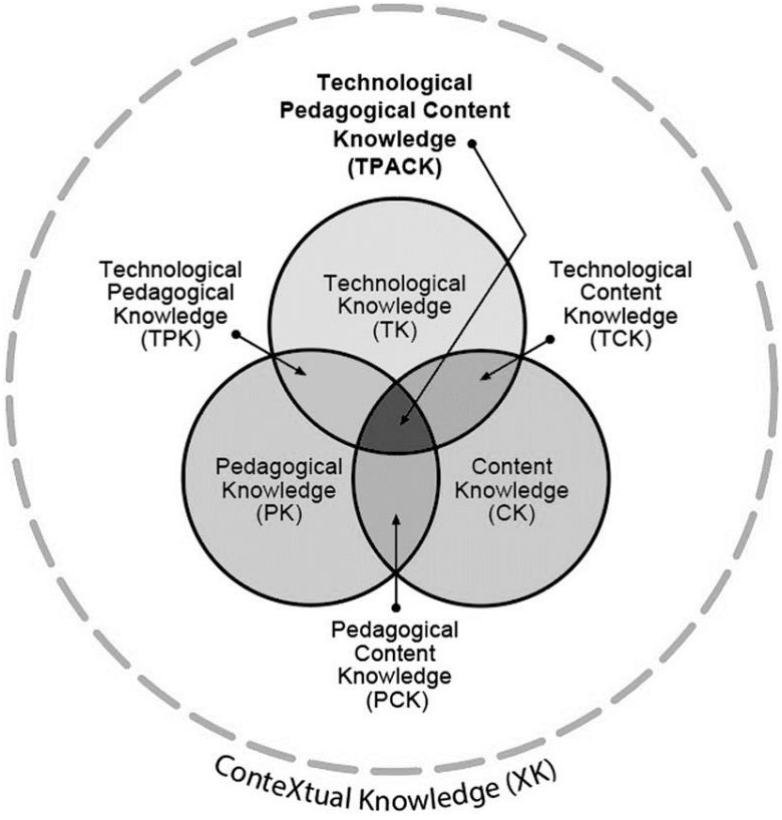
TPACK: A Theoretical Framework for Online Teacher Effectiveness

As the technological age ushered in a wave of changes for teachers, the need grew for frameworks that included technology as a factor influencing effective teaching. The technological, pedagogical, content knowledge (TPCK) framework was created as a way to understand how different types of teacher knowledge work together for effective integration of technology (Mishra et al., 2011). According to this framework, a teacher must be well-versed in all three types of knowledge (technology, pedagogy, and content) and be able to integrate that knowledge seamlessly in order to "develop appropriate, context-specific strategies and representations" (Mishra & Koehler, 2006, p. 1029). Pedagogical knowledge refers to "teachers' deep knowledge about the processes and practices or methods of teaching and learning" (Koehler et al., 2013, p. 15). In the 1980s, Shulman (1986) proposed that content knowledge and knowledge of pedagogy should not be viewed separately and created the idea of pedagogical content knowledge (PCK). PCK emphasized the interplay of both content knowledge and pedagogy with the belief that "for teachers to be successful, they would have to confront both issues simultaneously" (Mishra & Koehler, 2006, p. 1021). Mishra and Koehler (2006) built upon PCK to create TPCK by considering the important role of technology in learning that is present in the twenty-first century. According to TPCK, a lack of knowledge in any area, or failure to consider their intersection, could lead to ineffective teaching, lower teaching efficacy, and decreased learning for students. The authors of the framework desired it to guide research in

the area of teacher knowledge surrounding use of technology and the application of that knowledge (Mishra & Koehler, 2006), which is of particular interest in this study.

Since its introduction, TPCK has been used to evaluate technology integration in almost every educational setting and used as the central framework in over 1,200 journal articles and book chapters, over 300 dissertations and at least 28 books (Mishra, 2019). In 2008, the TPCK acronym was changed to TPACK (Technology, Pedagogy, and Content Knowledge) to facilitate easier understanding and pronunciation (Mishra, 2008), and will be referred to as such for the remainder of this paper. A fourth type of knowledge was clarified in 2019, officially adding contextual knowledge to the TPACK framework (Mishra, 2019). Contextual knowledge exists in the space surrounding TPACK and emphasizes the importance of teachers understanding the contexts that impact TPACK. Contextual knowledge (XK) allows the "organizational and situational constraints that teachers work within" (Mishra, 2019, p. 77) to be considered. The interplay of the different knowledge types within TPACK can be seen in Figure 1.

Figure 1
The TPACK Framework and Its Knowledge Components



Note. This image was created to illustrate the intersections within TPACK. From "Considering Contextual Knowledge: The TPACK Diagram Gets an Upgrade" (Mishra, 2019, p. 77).

Contextual Knowledge

Though TPACK is one of the most used frameworks to examine teaching with technology, contextual knowledge remains a domain that merits further exploration (Brianza et al., 2022, 2024; Mishra & Warr, 2021). Education contexts vary, ranging from micro-level factors like the layout of a classroom to meso and macro factors like specific institutional settings and society as a whole (Porras-Hernández & Salinas-Amescua, 2013). Most recently, researchers have defined contexts surrounding TPACK as five spaces within which education functions—artifacts, processes, experiences, systems, and culture (Mishra & Warr, 2021). These spaces offer a concrete way to think about spaces for design within educational contexts as well as an opportunity to explore how these spaces may be changed to improve teaching. The fourth and fifth spaces, systems and culture, encompass elements that teachers may have limited control over but the "knowledge of these broader systemic and cultural factors may be critical for educator success" (Mishra & Warr, 2021, p. 2). Though teachers themselves may not be able to control these factors, they are still influenced by them, especially in higher education settings where institutional culture has an especially large impact (Tierney & Lanford, 2018).

Institutional Culture

Previous studies have shown a relationship between TPACK levels and elements of institutional culture (Kaschuluk, 2019; Rienties et al., 2013; Voithofer et al., 2019), but specific research has yet to be conducted on what aspects of institutional culture impact TPACK among online instructors at higher education institutions. In the United States, there are several types of higher education institutions and each one has its own structure that creates a unique culture. Regardless of type, however, the institutional culture of each college or university encompasses the shared values and beliefs of the stakeholders of the institution and is socially constructed (Tierney & Lanford, 2018). Each state has their own policies regarding accreditation of higher education institutions, and different accrediting agencies and college boards have unique rules and regulations. The interplay of federal and state policies, governing board regulations, and accreditation requirements is complex and unique to each individual institution (Fish, 2007). Due to this complexity, the institutions of focus for this study will be non-profit, doctoral-granting research institutions in the United States.

At the organizational level, research institutions are often an anomaly in that two different organizational models exist within the organization at the same time (Manning, 2017). Administrators in higher education generally operate under a bureaucratic system while faculty function under the collegium. The bureaucratic system is characterized by a formal, hierarchical structure in which people and systems are organized for maximum efficiency (Baldridge, 1971). In higher education administration, there are clear channels of communication as well as rules and regulations governing all decision-making processes. The collegial model, however, emphasizes cooperation between all organizational members in order to accomplish goals and make decisions. In this model, which is generally accepted by faculty, leaders do not necessarily have power over followers as all members are considered equal. Faculty culture is largely influenced by the collegial model and shared governance and holds tradition in high regard (Manning, 2017). These structures create contextual factors that influence online teaching in various ways.

Measuring Institutional Culture

Institutional culture encompasses many aspects, but for the purposes of this study, the interest is in how the institutional culture "promotes continuous learning for sustainable improvement in teaching and learning" (Ponnuswamy & Manohar, 2014, p. 25). Marsick and Watkins (1994) referred to this as the learning organization culture. The learning organization encompasses a culture that empowers people while fostering collaboration and team learning, encouraging open dialogue, and recognizing the interplay of individuals, the organization, and the external environment (Marsick & Watkins, 1994). An institutional culture that promotes the learning organization emphasizes continuous learning that is strategically built in to daily work and recognizes the importance of rewarding employees for learning. A barrier to this type of culture can be "an inability to recognize and change existing mental models" (Marsick & Watkins, 1994, p. 356). Mental models refer to deeply held, value-based frameworks that are used by people to make sense of experiences. Faculty who are resistant to change may be locked into specific types of mental models that can inhibit the learning organization. In an effort to measure aspects of the learning organization, Marsick and Watkins (2003) developed a scale to measure "important shifts in an organization's climate, culture, systems, and structures that influence whether individuals learn" (p. 133). The Dimensions of the Learning Organization Questionnaire (DLOQ) focuses on seven dimensions of institutional culture: (1) create continuous learning opportunities, (2) promote inquiry and dialogue, (3) encourage collaboration and team learning, (4) create systems to capture and share learning, (5) empower people toward a collective vision, (6) connect the organization to its environment, and (7) provide strategic leadership for learning. The first four dimensions encompass characteristics at the individual level while the last three are representative of the structural level (Marsick & Watkins, 2003). The DLOQ has been used extensively across a variety of contexts, including higher education (Watkins & O'Neil, 2013). It is widely considered a reliable and valid measure of learning organization culture, which makes it ideal for measuring the dimensions of institutional culture in this study.

Research Questions

1. To what extent is the contextual factor of institutional culture related to TPACK in higher education faculty?

2. To what extent are specific dimensions of institutional culture related to TPACK among higher education faculty?

Methods

The purpose of this study was to determine if the contextual factor of institutional culture impacts TPACK among higher education faculty at institutions in the southeastern United States as well as to what extent specific dimensions of institutional culture affect TPACK levels. Exploring these factors is important because, if significant, these findings can inform decisions surrounding how to improve TPACK in higher education contexts.

Research Design and General Methods

To collect data for this study, a nonexperimental quantitative, correlational study design was used to determine how the contextual factor of institutional culture impacts TPACK as well

as to what extent specific dimensions of institutional culture impact TPACK among higher education faculty. A correlational study design was optimal for this study because there was no attempt made to establish causation between the development of TPACK and contextual factors. The primary goal of using this design was to determine to what extent contextual factors are correlated to TPACK levels. The independent variables in this study were the dimensions of organizational culture as measured by an amended version of the DLOQ. The DLOQ measures seven distinct dimensions of the learning organization, as laid out by Marsick and Watkins (1997). These dimensions include (1) creation of continuous learning opportunities, (2) promotion of inquiry and dialogue, (3) encouragement of collaboration and team learning, (4) empowerment of people toward a collective vision, (5) connection of the organization to its environment, (6) establishment of systems to capture and share learning, and (7) providing strategic leadership for learning.

The dependent variable was faculty's self-assessed TPACK. This scale included the seven dimensions of TPACK as outlined by Mishra & Koehler (2006). The seven dimensions are (1) technology knowledge (TK), (2) content knowledge (CK), (3) pedagogy knowledge (PK), (4) pedagogical content knowledge (PCK), (5) technological content knowledge (TCK), (6) technological pedagogical knowledge (TPK), and (7) technological pedagogical content knowledge (TPACK). Only the seventh dimension, TPACK, was measured as the dependent variable because this dimension is the comprehensive measure of TPACK levels and combines all the previous dimensions. The culmination of TPACK is defined by the seventh dimension and was the principal variable of interest in this study. Data were collected through an online survey distributed via email using Qualtrics survey software. The survey comprised three sections: (1) the DLOQ, (2) TPACK, and (3) demographic factors.

Instruments Used

As previously mentioned, the survey instrument consisted of three sections. The first section was comprised of the 21 questions from the DLOQ. The DLOQ was created to measure the seven dimensions of the learning organization, as defined by Watkins and Marsick (1997). The authors developed the items through both expert and student panels to ensure readability, then used Cronbach's coefficient alpha reliabilities and factor analyses to revise or eliminate poorly worded or weak loading items (Watkins & O'Neil, 2013). After several studies were conducted using this instrument, validation was completed using a cumulative database of responses from multiple studies and organizations (N = 836). Reliability analyses, exploratory and confirmatory factor analyses, and structural equation modeling were used to test construct validity, and results indicated high levels of reliability (.80 to .87) (Yang et al., 2004). The DLOQ remains widely used across many different fields and in a variety of organizational settings including for-profit corporations, non-profit organizations, the government, and both K–12 and higher education (Watkins & O'Neil, 2013). The DLOQ was chosen because these dimensions capture individual perceptions of organizational norms and expectations, which allows for a holistic picture of perceptions of institutional culture.

The second section comprised 24 questions focused on measuring TPACK. Archambault and Crippen (2009) developed a survey that uses TPACK as "a guiding framework for skills that online teachers should know and be able to do" (p. 75). The instrument underwent an expert

review to ensure all the items were complete and relevant. The survey was then piloted by K–12 teachers in an online virtual school, the intended population. Subscales used to measure pedagogy, content, and technology were found to show sufficient levels of reliability (alpha = .738, .911, and .928). The third section focused on demographic factors. Basic demographic data like race, ethnicity, gender, age, and education level were obtained, as well as data pertaining specifically to higher education like the name of the institution, faculty rank, years teaching online, and the education field of specialization.

Data Collection Procedures

Before data collection began, the study received Institutional Review Board approval. The survey was hosted with Qualtrics survey software. An email with an anonymous link to the survey was sent out to individuals who met participant qualifications at doctoral research institutions in the Southeastern Conference, as well as via listserv to all faculty and staff at Mississippi State University in the fall semester of 2023. Graphics containing information about the survey and the anonymous link were also shared on social media networks in order to recruit participants that were not captured through email. The survey opened with a Statement of Consent. Participants read this statement and indicated their consent to the data collection by continuing with the survey. The survey items related to TPACK and the DLOQ were measured using a Likert scale with 1 = "Strongly Disagree," 2 = "Disagree," 3 = "Somewhat Disagree," 4 = "Neither Agree nor Disagree," 5 = "Somewhat Agree," 6 = "Agree," and 7 = "Strongly Agree." Upon completion of the survey, participants were directed to a different link to enter their information for a chance to win a $25 Amazon gift card.

Data Analysis Procedures

Data were analyzed using a multiple linear regression model. This type of analysis was appropriate because there were multiple independent variables that needed to be controlled for (Sriram, 2017). The Technology Pedagogical Content subscale produced a continuous measure of the dependent variable, TPACK. To get a comprehensive score for TPACK, the scores for the four questions that pertained to TPACK were added together to produce a TPACK total score. The subscales representing the seven dimensions of the DLOQ produced continuous measures of the independent variables—(1) create continuous learning opportunities, (2) promote inquiry and dialogue, (3) encourage collaboration and team learning, (4) create systems to capture and share learning, (5) empower people toward a collective vision, (6) connect the organization to its environment, and (7) provide strategic leadership for learning (Marsick & Watkins, 2003). Total scores were calculated for each dimension by adding the scores from each question that measured that dimension. Demographic information collected via the survey, including gender, race, ethnicity, age, highest level of education, faculty rank, type of class taught, field, years teaching online, and years teaching total, was included as covariates.

To answer the first research question, "To what extent is the contextual factor of institutional culture related to TPACK in higher education faculty?" an F-test was conducted to test for significance in the overall model. The results were considered statistically significant if the p-value was less than or equal to 0.05. A statistically significant test was indicative of a meaningful relationship between institutional culture and TPACK among faculty at doctoral

research institutions, broadly. The R2 value was used to measure the effect size between the independent variables and the dependent variable. This value indicated to what degree of variance the dependent variable could be explained by the independent variables through a percentage. For example, an R2 value of 0.35 would show that the dimensions of the DLOQ account for 35% of TPACK.

To answer the second research question "To what extent are specific dimensions of institutional culture related to TPACK among higher education faculty?" the seven dimensions of the DLOQ were examined individually as they related to TPACK. Individual effects from the multiple linear regression model were examined. Regression coefficients served as measures of the effect of each of the individual variables; more specifically, a regression coefficient was produced for each dimension of the DLOQ and indicated the magnitude of relationship between that specific dimensions and TPACK, after controlling for all other variables included in the model. Together, the multiple linear regression model results and individual regression coefficients were used to determine if institutional culture was related to TPACK, and if so, which specific dimensions of institutional culture impacted TPACK. These results allow institutions to focus on the elements of institutional culture that could make the most transformational change when it comes to TPACK and online teaching and learning.

Results

This study aimed to determine if a correlation exists between the contextual factor of institutional culture and overall TPACK among online higher education faculty in the Southeastern Conference, as well as to what extent individual dimensions of institutional culture impact TPACK. This section details the results of the data analysis as well as the descriptive statistics of the sample.

Descriptive Statistics

The target population for this study was faculty at non-profit doctoral-granting higher education institutions in the Southeastern Conference who have taught at least one class online since 2021. Purposive sampling was used to identify participants who fit the qualifications and emails were sent out with the anonymous survey link. A graphic was also shared on social media to recruit participants who may not have been on the email listservs. There were 149 total responses recorded. Of the total responses, there were 39 missing cases; therefore, they will be excluded from these statistics. The final total sample size was 110 (N = 110). Frequency statistics showed that there was an even distribution of gender within the sample with 44 (40%) participants indicating they were men, 43 (39.1%) indicating they were women, and 2 (1.3 = 8%) preferred not to say. Responses recorded for race indicated 7 (6.4%) of participants were Asian, 6 (5.5%) were Black or African American, 73 (66.4%) were white, 1 (0.9%) was other, and 23 (20.9%) were missing items. There was one participant who indicated they were of Hispanic or Latino or Spanish origin and 85 (77.3%) indicated they were not of Hispanic or Latino or Spanish origin. The highest percentage of the sample (25.2%) indicated they were between 31 and 60 years old.

Data were also collected for academic measures including highest education level, rank, primary delivery method of online courses, class level primarily taught, field of expertise, years

teaching online, years teaching total, institution of primary employment, and whether or not professional development/training is required to teach online. For highest education level, 7 (6.4%) participants had a bachelor's degree, 15 (13.6%) had a master's degree, 2 (1.8%) had a specialist degree, and 64 (58.2%) had a doctoral degree. When asked to indicate faculty rank, 36 (32.7%) chose tenure track/tenured, 8 (7.3%) chose tenure track/untenured, 6 (5.5%) chose staff who teaches a class, 14 (12.7%) chose instructor/lecturer (full-time employee), 8 (7.3%) chose adjunct instructor (part-time employee), and 17 (15.5%) chose other. Participants denoted that 48 (43.6%) of them taught asynchronous online courses, 10 (9.1%) taught synchronous online courses, and 19 (17.3%) taught hybrid courses. The class level primarily taught was shown to be 38 (34.5%) undergraduate, 16 (14.5%) graduate, 8 (7.3%) split-level, and 20 (18.2%) both undergraduate and graduate. Arts and Sciences was the primary field with 22 (20.0%) participants, followed by Other Field with 14 (12.7%), Agriculture and Life Sciences with 13 (11.8%), Engineering with 12 (10.9%), Education with 9 (8.2%), Business with 6 (5.5%), Professional and Continuing Studies with 4 (3.6%), and Architecture, Art, and Design with 3 (2.7%). Responses for Years Teaching Online and Years Teaching Total are shown in Table 1.

Table 1
Years Teaching Online and Years Teaching Total, In Percentages

	0–2 Years	3–5 Years	6–10 Years	11–15 Years	More than 15 Years
Years Teaching Online	20%	20%	14.5%	14.5%	6.4%
Years Teaching Total	9.1%	9.1%	15.5%	12.7%	30%

Note. N = 110

Finally, 45 (40.9%) participants indicated professional development/training was not required to teach at their institution and 37 (33.6%) indicated that it was required.

Multiple Linear Regression Analysis

Data were analyzed using multiple linear regression. This type of analysis was appropriate because multiple independent variables were being tested. The dependent variable was overall TPACK and the independent variables were the seven dimensions of the DLOQ—(1) create continuous learning opportunities, (2) promote inquiry and dialogue, (3) encourage collaboration and team learning, (4) create systems to capture and share learning, (5) empower people toward a collective vision, (6) connect the organization to its environment, and (7) provide strategic leadership for learning (Marsick & Watkins, 2003). Demographic factors were also included as covariates. The first research question—"To what extent is the contextual factor of institutional culture related to TPACK in higher education faculty?"—was analyzed through an F-test to test for significance in the overall model. The result was a p-value of .546, which was not considered significant. This means that a meaningful relationship was not found between overall institutional culture and TPACK among online faculty at doctoral research institutions in the Southeastern Conference. The R2 value was .678, which indicated that the dimensions of the

DLOQ accounted for 68% of TPACK. Though there was not significance found in the overall model, there was significance found during analysis for the second research question.

The second research question—"To what extent are specific dimensions of institutional culture related to TPACK among higher education faculty?"—was measured through an examination of the seven dimensions of the DLOQ individually. The demographic factors described previously were also included as covariates. Before including these items in the regression, dummy codes were created for each demographic item with more than two groups in order to provide a more meaningful analysis of the results. The reference categories that were excluded from the analysis were as follows: man, white, 41–50 age group, specialist's degree, tenure-track-tenured, hybrid classes, split-level, Arts and Sciences, 3–5 years teaching online, 6–10 years teaching total, and Mississippi State University. The following categories were excluded because there was not enough data to be analyzed: non-binary/another gender, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, two or more races, 81–90 age group, 91–100 age group, adjunct faculty, and Medical Sciences. The regression coefficients for each dimension, as well as covariates, can be seen in Table 3.

Table 3
Results of Regression Analysis for the Seven Dimensions of the DLOQ

	Unstandard-ized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Create Continuous Learning Opportunities	-.503	.586	-.492	-.859	.401
Promote Inquiry and Dialogue	.901	.485	1.063	1.856	.079
Encourage Collaboration and Team Learning	-1.253	.371	-1.486	-3.376	.003*
Create systems to Capture and Share Learning	-.394	.287	-.487	-1.372	.186
Empower People Toward a Collective Vision	.387	.262	.505	1.478	.156
Provide Strategic Leadership for Learning	-.134	.350	-.172	-.381	.707

Connect the Organization to its Environment	1.224	.495	1.391	2.472	.023*

Note. *$p > .05$

As shown in the table, two dimensions of the DLOQ, (3) encourage collaboration and team learning and (6) connect the organization to its environment, showed statistical significance suggesting that those specific dimensions impact overall TPACK. Analysis from the model suggested there is a not a relationship between overall institutional culture and TPACK. However, there was shown to be a possible relationship between the individual dimensions of "Encourage Collaboration and Team Learning" and "Connect the Organization to its Environment" and TPACK, even after controlling for demographic factors. None of the covariates were shown to be significant when included as independent variables.

Discussion of Findings

The analysis of data pertaining to the first research question—"To what extent is the contextual factor of institutional culture related to TPACK in higher education faculty?"—suggested that there is no relationship between overall institutional culture and TPACK. This finding is in contrast with results obtained by Rienties et al. (2013) that suggest institutional culture does play a role in TPACK. However, the study by Rienties et al. (2013) took place in the Netherlands before COVID-19 so the context related to the present study is not comparable. The findings are consistent with Kaschuluk (2019) who, when examining TPACK among K–12 teachers in the United States, also found that overall culture was not related to TPACK, but there is a possible relationship between TPACK and individual domains of culture.

Although overall institutional culture was not found to have a significant effect on TPACK, there were individual domains of the DLOQ that were significant, which is consistent with previous studies (Kaschuluk, 2019; Voithofer et al., 2019). The first domain that was found to be significant with TPACK was "encourage collaboration and team learning." Kaschuluk (2019) also found this specific domain to be significant, which may confirm the validity of this finding. This domain is described by Marsick and Watkins (2003) as follows: "Work is designed to use groups to access different modes of thinking; groups are expected to learn together and work together; collaboration is valued by the culture and rewarded" (p. 139). Group learning is important because it facilitates transfer of knowledge and skills, enables members to gain new perspectives, and leads to reframing. Reframing allows group members to experiment and use trial and error to construct new knowledge by combining perspectives (Marsick & Watkins, 1994). The results of this study suggest that collaboration and team learning is strongly correlated with TPACK levels. A restriction of collaboration and team learning may negatively impact TPACK. This means that when institutions restrict employees' freedom to question common practices or do not reward collaboration towards team projects (O'Neil, 2003), they could also diminish TPACK among their faculty.

The second domain that was found to be significant was "connect the organization to its environment." Marsick and Watkins (2003) describe this domain as "People are helped to see the effect of their work on the entire enterprise; people scan the environment and use information to adjust work practices; the organization is linked to its communities" (p. 139). Development of this domain takes place at the societal level (Kim et al., 2015) and involves faculty feeling they can positively contribute to the institution as a whole. This domain was not found to be significant in any other similar study, which suggests it could be specifically important for higher education. It could also indicate that, post-COVID-19, people value connection to their environment and institution more highly than before. A lack of connection to the organization and the environment may negatively affect TPACK. According to these findings, institutions that do not support a global perspective, have limited involvement in the local community, and conduct work in silos (O'Neil, 2003), may see diminished TPACK levels among their faculty.

Findings Related to Institutional Culture

As mentioned previously, overall institutional culture was not found to be significant with overall TPACK, but specific dimensions of institutional culture were found to be significant. This is somewhat surprising and merits further discussion, especially considering the study by Kaschuluk (2019) yielded similar results. The DLOQ is a measurement that has been used in a variety of fields, including higher education, but it was not developed specifically for education. The research that led to the development of the DLOQ was largely focused on corporate organizations (Marsick & Watkins, 1994). Perhaps, given these findings and the complex organizational structure of educational institutions, institutional culture should be measured as a multidimensional construct. The DLOQ may still be good fit to measure institutional culture in education, but the specific dimensions may yield more constructive results than the totality of the measure. This study may also show that the DLOQ is not the best measure to measure institutional culture in higher education. This measure was chosen because its previously established validity and reliability (Marsick, 2013), its specific focus on the institution as a learning organization, and its previous use to measure institutional culture related to TPACK (Kaschuluk, 2019). However, there are other measures, like the Institutional Teaching Culture Perception Surveys (ITCPS; Shaw et al., 2021) developed specifically for higher education, that may give more clarity to institutional culture in education settings.

Limitations

There were several limitations that could have impacted the results of this study. The first set of limitations relates to the sample. This study was open to online faculty who have taught since 2021 at a non-profit doctoral degree granting institution in the Southeastern Conference. Though faculty were contacted at every university in the conference, only faculty from Mississippi State University, the University of Mississippi, and the University of Kentucky responded. Participants at Mississippi State University were the overwhelming majority, which limits the ability to generalize about institutional culture across large doctoral granting institutions in the southeast. Additionally, the total sample size was 110 respondents. Though the goal was to have at least 100 participants, a larger sample size would have enabled a better understanding of the variables and relationships and, although there was an equal distribution of men and women who participated, the vast majority of the sample indicated they were white.

This limits the ability to understand how TPACK might change according to race. Another limitation was that TPACK was self-reported in this survey. Measuring TPACK through performance assessments would yield an unbiased assessment of true TPACK.

Recommendations for Institutional Leaders

This study yielded several significant findings that may give institutions practical ways they can change institutional culture to improve TPACK among their online faculty. Because the study suggested that collaboration and team learning is important for TPACK development, administrators at higher education institutions should strive to create opportunities for faculty to share ideas, gain new perspectives, and create new knowledge. This can be accomplished through establishing rich communities of practice and professional development opportunities and encouraging or incentivizing faculty to participate in these opportunities. Though this study did not find significance surrounding whether or not training and professional development was required, optional or incentivized training could still prove worthwhile given that previous research has confirmed training and professional development to have a positive impact on teacher effectiveness and attitudes about teaching (Knight et al., 2007; Roman et al., 2010; Steinert et al., 2006). The findings of this study suggest administrators should invest in opportunities for faculty to collaborate, which could include providing funding for conferences, holding events focused on networking, and encouraging faculty to move beyond siloed projects.

Another significant finding from this study was that connection to the institution and its environment may play a role in TPACK development. This finding is novel among related research on TPACK and institutional culture and sheds light on the importance of the environmental context. Administrators should consider establishing opportunities for faculty to connect to society though virtual global teams and working to diminish cultural barriers within the institution. They should also work together with the local community to address local issues and align institutional goals with the needs of the community while encouraging faculty to contribute to these efforts. Providing workforce diversity training is another way to establish a connection to the external educational context and challenge faculty to understand and work from a global perspective. Additionally, connecting to the institution and its environment relates directly to the service aspect of faculty work, a piece that is often overlooked during the promotion and tenure process. By providing more recognition and placing more importance on service during the promotion and tenure process, administrators may help to develop a rich and connected culture.

Recommendations for Future Research

The results of this study provide promising implications for understanding how specific dimensions of institutional culture may impact TPACK among online higher education faculty. Significance was found between the dimensions of collaboration and team learning and connecting the organization to its environment and TPACK levels. Because this study was the first to focus on these variables among online higher education faculty since COVID-19, further research is needed to confirm these findings. Future studies should strive to recruit a sample that is larger than the sample included in this study so that results may be generalizable to the population. Additionally, the sample should include participants from a more diverse racial background in order to provide a more complete picture of the perspectives of the population.

Studies conducted in the future should also try to measure TPACK through performance assessments, instead of a self-reported survey, in order to decrease bias that comes from the nature of self-reported results. Future research might also explore institutional culture using a different measure than the DLOQ. A scale specifically developed for higher education could provide more clarity on institutional culture in this context.

Conclusion

Overall, the findings from this study give administrators, faculty, and future researchers a baseline for measuring the impact of institutional culture on TPACK following the COVID-19 pandemic. In order to be relevant and effective in this new era of education, higher education institutions should carefully consider their current efforts and policies surrounding teaching and learning online and how the culture at their learning organizations might impact TPACK. Because improving TPACK levels among higher education faculty could be vital to improving effective teaching online, this study paves the way for institutions to make real strides in the area of teaching and learning, thereby improving the experience for both students and faculty, and building new ways for everyone, regardless of location or status, to earn a life-changing education.

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