The Online Teaching Motivation Scale (OTMS): Development and Validation of a Survey Instrument

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Abstract

The purpose of the current study was to develop and validate the Online Teaching Motivation Scale (OTMS), a survey instrument designed to reliably measure motivational constructs related to online teaching and learning. The widespread prevalence of online and hybrid teaching modalities, many established during the COVID-19 pandemic, has necessitated reliable, valid measures to better understand factors that impact teachers' motivation for online teaching and learning. The OTMS went through a rigorous validation process, including a pilot survey for content review, digital administration to K–12 teachers (N=379), and confirmatory factor analysis. The result was a 24-item survey designed to measure teacher motivation for online teaching based on three factors: teacher self-efficacy for online teaching, teacher perceptions of online teaching and learning, and perceived administrative support for online teaching. The OTMS was found to have a strong model fit, as well as strong reliability and validity measures. Future research includes wide administration of the OTMS to examine the relationship between K–12 teacher motivation for online teaching and students' achievement and to inform the development of appropriate support models.

Keywords: online education, teacher motivation, self-efficacy, teacher perceptions, administrative support

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The widespread prevalence of online and hybrid teaching modalities due to the COVID-19 pandemic has necessitated reliable, valid measures to better understand teachers' motivation for online teaching and learning (Lehrer-Small, 2022; Ascione, 2021; Plitnichenko, 2021). Research indicates that multiple factors influence teachers' motivation for online pedagogy, including efficacy (Eccles & Wigfield, 2002), teacher perceptions about the effectiveness of online learning (Yang, 2020), and perceived administrative support (McLeod & Richardson, 2014). However, an examination of existing literature revealed a need for reliable, valid instrumentation to study the model of these variables on teachers' motivation for online teaching. Gaining an understanding of teacher motivation is important since motivation is tied to student achievement outcomes (Watt & Richardson, 2013). As teachers continue to navigate the increased presence of technology in K–12 classrooms, it is important that administrators understand teachers' motivation for online teaching, and work to provide appropriate support. Though the pandemic has subsided, the current state of technology-supported education in K–12 schools depends on the location and school district. Some schools are continuing to fully embrace online teaching and learning by offering virtual classes as part of the standard curriculum, while others are using online instruction during inclement weather or implementing online learning experiences as part of the regular, in-person school day. Prior to and following the pandemic, online teaching and learning continued to grow in popularity, and this trend is expected to continue (Lehrer-Small, 2022). Therefore, the need for valid and reliable measures of teachers' motivation for online teaching is essential to gaining a deeper understanding of the methods of support needed by K–12 educators to continue their professional development of online teaching skills and to examine possible connections to students' achievement.

The purpose of the present study was to develop and validate the Online Teaching Motivation Scale (OTMS), an instrument designed to measure motivational constructs related to online teaching and learning. The following research question guided our work:

How can we measure the following elements of teachers' motivation for online teaching in a reliable and valid way?

- Teacher self-efficacy for online teaching (operationally defined as teachers' beliefs in their ability to teach online)
- Teacher perceptions of online teaching and learning (operationally defined as teachers' beliefs about the effectiveness of online teaching)
- Perceived administrative support for online teaching (operationally defined as teachers' beliefs about how their administration supports their development for online teaching)

Review of the Literature

There has been significant growth in online teaching and learning in the K–12 sector over the past several years (Lehrer-Small, 2022). Many schools were forced into emergency online teaching during the COVID-19 pandemic (Karaferye, 2022); consequently, the growth of online teaching and learning has continued to accelerate in America's schools. Teachers in America's K–12 classrooms are using technology and online learning in myriad ways, including enrichment for student learning, interactive materials, and other learning platforms (Crossland et al., 2018), as well as fully online classes, instruction during school closures, and in-class instructional tools.

As a result of the pandemic, K–12 schools across the U.S. have increased the availability of online learning resources to support student learning both in and out of the classroom, and many teachers continue to use online teaching as part of their classroom pedagogy (Ascione, 2021; Plitnichenko, 2021). Due to this increased prevalence, it is imperative that we continue to monitor teachers' motivation for online teaching to best support their developmental and psychological needs.

An initial dive into recent literature revealed that K–12 teachers desired more professional development, training, and resources related to online teaching and learning (An et al., 2021; Ogodo et al., 2021) and that many teachers had low self-efficacy for online teaching and learning (Cardullo et al., 2021; Durak, 2019; Ogodo et al., 2021). Additionally, despite the widespread use of online teaching and learning in K–12 classrooms, many teachers held negative perceptions about the effectiveness of this learning modality (Orhan & Beyhan, 2020; Rahayu, 2020). These insights led to an investigation of existing surveys to examine K–12 teachers' perceived administrative support (e.g., support for professional development, resources, etc. for online teaching), self-efficacy for online teaching, and perceptions of online teaching and learning within a larger context of motivation for online teaching.

Existing Surveys

A review of the literature revealed several instruments that have been developed to measure motivation for online teaching; however, none of the instruments fully matched the needs or intended applications of the OTMS (Davis, 1989; McFarlane et al., 1997; Nguyen, 2023; Vannatta & Banister, 2009; Zimmerman & Kulikowich, 2016). The convergence of the three constructs (teacher self-efficacy for online teaching, teacher perceptions of online teaching and learning, and perceived administrative support for online teaching) in the OTMS is grounded in the motivational literature and supports a current perspective concerning teachers' motivation for online teaching. Below we review these existing scales in greater detail to further justify the need for the OTMS.

Davis' (1989) Technology Acceptance Model (TAM) provides a valid instrument to examine the relationship between users' behavior and their perception of the usefulness and ease of use of a specific technology. Perceived usefulness and ease of use have been shown to be indicators of an individual's self-reported system use (Davis, 1989). The items on the OTMS are aligned with the theoretical foundations of the TAM, addressing both "perceived usefulness" and "perceived ease of use" through items corresponding to teachers' perceptions of online teaching and learning and teachers' self-efficacy for online teaching. However, the OTMS also includes a third motivational construct, perceived administrative support for online teaching. By addressing all three motivational constructs, the OTMS is a tool educational leaders can use to gather actionable data for informing the development of appropriate support models for online teaching and learning.

Nguyen (2023) used Davis' (1989) work to develop and implement a survey instrument related to teachers' attitudes toward online teaching. Her work included a factor called "external assistance," and her findings supported hypotheses that external assistance has a positive effect on teachers' perceived usefulness of online teaching adoption and that external assistance has a positive effect on perceived ease of use of online teaching adoption. Her findings provide support for the inclusion of items addressing perceptions of administrative support on the OTMS.

However, Nguyen used a narrower operational definition of online learning than that used to develop and validate the OTMS. She defined online learning as learning that is conducted in an entirely virtual space, with no face-to-face interaction. In the development of the OTMS, online teaching and learning was defined as, "education being delivered in an online environment through the use of the internet for teaching and learning" (Singh & Thurman, 2019, p. 302). This includes students who are participating in fully online, hybrid, or face-to-face classrooms with access to online learning tools. Additionally, Nguyen's (2023) study surveyed only high school teachers in Vietnam, whereas the OTMS was developed for a broader population (K–12 educators) in the United States.

The Online Teaching Self-Efficacy Scale was published by Zimmerman and Kulikowich in 2016. This scale was developed to measure the self-efficacy of post-secondary students and consists of three subscales: learning in the online environment, time management, and technology use (Zimmerman & Kulikowich, 2016). Although this scale addresses the factor of self-efficacy, it does not measure teachers' self-efficacy and is not intended for use in the K–12 environment. Although the scale could have been administered to a K–12 teacher population to test for validity, this scale did not measure teacher perceptions of online teaching or perceived administrative support. These two factors, in addition to self-efficacy, emerged initially from an extensive review of the literature when the OTMS being developed. The literature revealed these factors as important components of teacher motivation for online teaching in today's classroom. Therefore, the Online Teaching Self-Efficacy Scale did not have a large enough scope to assess the factors of motivation offered by the OTMS.

Alternatively, the Technology Attitude Survey (TAS) was developed in 1997 by McFarlane et al. to assess teachers' attitudes toward using technology in their teaching. This scale was tested on a small sample (n = 86) and the population tested was foreign language teachers (McFarlane et al., 1997). Therefore, this scale may not be generalizable to a broader population of K–12 educators, The OTMS was tested with teachers of grades K to 12 and teachers of all subject areas. The Teacher Attitudes Toward Technology Survey could be an option if the goal were to better understand foreign language teachers' attitudes toward technology. However, due to the recent increased presence of technology in K–12 classrooms across America, the goal of the OTMS was broader in scope. The OTMS offers teachers, administrators, and researchers some insight into the motivation of K–12 teachers on three research-based factors.

Finally, the Teacher Technology Integration Survey (TTIS) was an instrument developed by Vannatta and Banister (2009). Vannatta and Banister synthesized the work of other researchers who developed instruments examining separate aspects of teachers' use of technology in educational settings. The TTIS bears the most in common with the new OTMS instrument, both including some constructs that overlap, such as teachers' self-efficacy and perceptions about technology use in the classroom. However, the two instruments diverge significantly in their purpose and applications. While the TTIS provides insight into how teachers use technology, the OTMS examines the underlying motivation for teachers to implement online teaching and learning practices.

Guiding Theories

With the evolving landscape of online teaching and learning in K–12 education due to post-pandemic technology resources, federal requirements (e.g., Every Student Succeeds Act), and an ever-increasing technology-based society, it is important that K–12 teachers are using the technology resources available and continuing to develop their professional skills and knowledge for online teaching. The development of the current instrument is grounded in the theoretical framework of motivation. Motivation is a psychological construct that can be broadly defined as "the processes that energize, direct, and sustain behavior" (Ormrod, 2006, p. 214). Highly motivated teachers may be more likely to engage in behaviors that enhance their teaching effectiveness (Smart & Linder, 2018; DiPerna & Elliott, 1999; DiPerna et al., 2005; Whang & Hancock, 1994), including effective goal setting, focusing effort, and persisting through challenges (Ormrod, 2006). Highly motivated teachers are also more likely to view instructional tasks as valuable and important (Eccles & Wigfield, 2002). Teachers who report high motivation may also employ more effective metacognitive strategies when approaching a new or challenging instructional task, such as transitioning to or working within an online environment (Pintrich, 2000).

An investigation of the literature revealed three constructs related to teacher motivation for online teaching and learning: teacher self-efficacy for online teaching, teacher perceptions of online teaching and learning, and perceived administrative support for online teaching. To better understand these constructs, an instrument was needed, the development of which was the purpose of this study. Within the literature, the self-efficacy, self-perception, and leader-member exchange theories all served as guiding frameworks for the development of the OTMS.

Self-Efficacy Theory. Self-efficacy is a central concept to the development of motivation for a task or skillset (Bandura, 1977; Bandura, 1989). Individuals with high self-efficacy for a task have confidence in their ability to perform the task effectively. In contrast, low self-efficacy is marked by a lack of confidence in one's abilities to succeed at a given task or domain (Pintrich & Schunk, 2002; Pintrich, 2000).

Bandura (1989, 1997) noted that self-efficacy can be predictive of an individual's motivation, affect, and behavior. For example, research indicates that self-efficacy can influence individuals' persistence when faced with challenges and can affect the level of effort expended on difficult tasks (Britner & Pajares, 2001; Pajares, 1996). In addition, individuals who are confident about their ability in a specific area are more likely to attempt challenging tasks, persist at those tasks, and make positive attributions for both their success and failure (Bandura, 1997, 1989).

Bandura (1989, 1997) theorized that several key experiences contribute to an individual's self-efficacy for any given domain. These experiences included mastery experiences, vicarious experiences, social persuasion, and physiological states. Mastery experiences are small successes with tasks that help foster efficacy for completing similar or related tasks in the future. Vicarious experiences are those in which the individual observes a similar individual successfully complete a task and consequently experiences an increase in personal efficacy for the same tasks. Social persuasion refers to the role of negative and positive feedback in relation to an individual's ability to facilitate a decrease or increase in efficacy for a related task. In terms of physiological states, Bandura noted that individuals interpret their internal state as positive or negative. This, in

turn, affects the way that individuals perceive their efficacy for completing a task. Bandura (1989, 1997) noted; however, that these four mechanisms work together to influence an individual's self-efficacy; one experience alone is seldom sufficient for long-term effects on an individual's efficacy for a specific task or domain. Self-efficacy has also been shown to be a predictor of motivation for online teaching and learning (Baroudi & Shaya, 2022). Often, teachers who have previous experience with online teaching are more likely to be afforded additional professional development opportunities, and as a result, feel more prepared and demonstrate higher levels of self-efficacy (Baroudi & Shaya, 2022).

Self-Perception Theory. Self-perception theory is a psychological theory that explains how people come to understand and interpret their own thoughts, feelings, and behaviors (Deci et al., 1999; Freedman & Fraser, 1966; Bem, 1972). Self-perception theory, proposed by psychologist Daryl Bem in 1972, suggests that people infer their own attitudes and beliefs by observing their own behavior and the context in which it occurs. According to self-perception theory, when people engage in a behavior, they look at their behavior and the context in which it occurred to determine their attitude towards that behavior.

Self-perception theory suggests that people use their behavior as a cue to infer their internal states, and this process is particularly relevant when people do not have a clear or pre-existing attitude towards a particular behavior or situation (Deci et al., 1999). Moreover, self-perception theory also suggests that people can develop attitudes and beliefs about themselves based on the roles they adopt and the behavior that they display in those roles. This process is influenced by the social context in which the behavior occurs, as people use cues from the situation to help interpret their own behavior.

Self-perception theory has been used to explain phenomena such as the foot-in-the-door effect, where people are more likely to comply with a large request after first agreeing to a smaller request (Freedman & Fraser, 1966), and the overjustification effect, where extrinsic rewards can decrease intrinsic motivation (Deci et al., 1999).

Leader-Member Exchange Theory. Leader-Member Exchange (LMX) is grounded in Lord et al.'s (1985) and Eden and Leviatan's (1975) formative work on Implicit Leadership Theory (ILT). Although it has many facets and has developed over time, ILT reveals that each individual within an organization has preconceived ideas about leaders based on a set of characteristics that they perceive as good leadership characteristics. When those align with the actual characteristics of the leader they are perceived as a good leader. When there is alignment between the perceived characteristics of good leaders and their actual characteristics, high levels of leadership support are reported, which positively impacts the motivations of the individual to work within the organization. However, it should be noted that each individual holds separate ideas about the characteristics of a good leader.

To better understand how perceptions of leadership impact motivation, understanding the relationship between leaders and those being led becomes critical to the process. Perceptions of leadership are defined by the relationship that exists, or fails to exist, and the nature of the interactions between the leader and those they lead. Leader-Member Exchange Theory (LMX) provides a framework to evaluate both the level and quality of interaction between leaders and those they lead, as well as the characteristics of both leaders and those they lead (Dansereau et

al., 1975). When LMX is high, the relationship is differentiated between leaders and those they lead (i.e., everyone is not treated the same). In low LMX organizational relationships, the leader generally is more homogenous in how each individual under their leadership is treated. Both methods have advantages and disadvantages. Likewise, both impact how individual constituents might rate those in leadership positions (Scandura & Graen, 1984). In K–12 school settings, administrators serve as leaders, and administrative support has been identified as a leading factor in teacher recruitment, retention, and motivation (Tran & Dou, 2019; Demil, 2021).

The Present Study

The purpose of this study was to develop and validate the OTMS, a survey-instrument designed to measure K–12 teachers' motivation for online teaching. The OTMS represents a valid and reliable measure of K–12 teachers' motivation for online teaching by evaluating three constructs: teachers' self-efficacy for online teaching, teachers' perceptions of online teaching and learning, and perceived administrative support for online teaching. This survey is a needed addition to the current educational literature due to the steady increase in online teaching and learning seen in K–12 education during and following the pandemic and the importance of understanding teacher motivation for best using online teaching and learning in an educational context.

Method

Initial Survey Development

Prior to developing the pilot draft of the OTMS, we conducted an extensive review of the literature about K–12 online teaching and learning. During that review, three critical constructs emerged concerning teachers' motivation for teaching online: teachers' self-efficacy for online teaching, teachers' perceptions of online teaching and learning, and perceived administrative support for online teaching. These dimensions were informed by three key theories of motivation: self-efficacy, self-perception, and leadership-member exchange (a thorough discussion of these grounding theories is provided above). Guided by these motivational theories, we developed an initial survey consisting of 45 multiple-choice items. Respondents were prompted to indicate their level of agreement with each statement using a 4-point Likert-type scale (Strongly Disagree, Disagree, Agree, Strongly Agree).

Content Expert Review

After the initial survey was developed, we had four researchers, three instructional leaders, and two measurement experts assess the face validity of the OTMS via a content expert review. We provided each participant with a copy of the items and asked them to assign each item to the construct they believed was the best fit. We then asked them to rate their confidence in their construct assignment on a scale of 1 to 3 (Not confident at all [1] to very confident [3]). Any item assigned by reviewers to the incorrect construct more than 10% of the time or which had a confidence rating of less than 2.5 (Gentry & Gable, 2001) was eliminated. Based on these criteria, eight items were eliminated, and 37 items remained on the instrument. In addition to these 37 multiple-choice items, seven demographic items were included at the beginning of the scale.

Survey Implementation: Participants and Setting

Data for this quantitative study were collected by administering the OTMS to a total of 379 in-service K–12 public school teachers between 2020–2021 (Table 1). The survey link was emailed to participants and all data were collected in Qualtrics. Due to the timing of the survey (during the height of the COVID-19 pandemic), several teachers were teaching in a fully online environment, while others continued to teach in hybrid and face-to-face environments. Three public school districts in South Carolina agreed to distribute the survey link to teachers via email. Additionally, the survey link was made available to practicing K–12 teachers who participated in on online graduate course at a university in the Southeast.

Respondents reported preschool or elementary (47%) as their primary level of instruction followed by high school (37%) and middle school (15%). Male teachers represented 18% of the respondents, while female teachers represented 82% of the respondents. Finally, 41% of the teachers reported teaching face-to-face only during the past school year, 42% taught both online and face-to-face, and 16% taught online only.

Table 1

Demographics of OTSM Survey Respondents Between 2020–2021

	Face-to-Face Only	Hybrid (Online and Face-to-Face)	Online Only
Grade Band			
Preschool/Elementary	71	72	36
Middle	20	28	10
High	66	59	15
Other		2	
Gender			
Male	42	20	6
Female	115	138	56
Non-binary	0	1	0
Not Disclosed	0	1	0

Note. $N = 379$.

Results

Validity of Measures

The construct validity of the OTMS was evaluated by conducting a confirmatory factor analysis (CFA). This analysis was used to verify and validate a predetermined 3-factor structure that was based on the three guiding motivational theories of Self-Efficacy Theory, Self-Perception Theory, and Leader-Member Exchange Theory. Our choice of fit indices (CFI, TLI, RMSEA, and SRMR) was driven by Sun's (2005) guidelines related to the purpose of the CFA and Brown's (2015) recommendations to include one index from the following three classes: absolute, comparative, and parsimony. For this reason, we reported SRMR and robust chi-square test statistics as measures of absolute fit, CFI and TLI as measures of comparative fit, and RMSEA as an indicator of parsimony-adjusted absolute fit. Within these three categories, we followed Sun's guidelines (e.g., SRMR is consistent across different estimation methods, CFI is robust to even small sample sizes). What's more, specifically, when the goal of the study is to contribute to construct validity evaluations (which our study is), Sun recommended SRMR, TLI, RMSEA, and CFI. The results of the CFA are reported below.

Table 2 makes clear that the baseline model of all items on the initial scale was a fair starting place but was not replicated by the observed data. None of the fit statistics met traditional criteria for good fit. This suggested that the underlying structure did not adequately represent the data and that revisions should be considered. Next, we ran a single-factor model. The single-factor model evaluated whether the three latent factors made sense by loading all items onto a single factor. The result was an even worse-fitting model and a significant increase in the chi-square test statistic. As a result, we returned to the three-factor structure and examined modification indices to identify potentially problematic items. Items that cross-loaded heavily onto multiple factors were removed. Additionally, several items showed strong correlations with other items. In these cases, we removed one item from each pair once it was clear that the content did not require two items. After reviewing these changes and being satisfied that the instrument followed the proposed three-factor model and still represented the underlying constructs, the model was run and resulted in a much-improved model fit.

The final three-factor model has a CFI of 0.95, indicating a good model fit (Hu & Bentler, 1999). The TLI is .94, also indicating a good model fit (UCLA, 2021). The RMSEA is 0.3, also indicative of a good model fit (Hu & Bentler, 1999), and the SRMR is 0.5, which is on the lower bound of a good model fit, or the upper bound of an acceptable model fit. Taken together, these fit indices reveal a strong three-factor model for the OTMS. McCoach et al. (2013) argue that reliability levels from affective instruments, like the OTMS, tend to be lower than those from cognitive assessments (e.g., standardized achievement tests) in part because of the stability of the underlying constructs, but also because of the difficulty in crafting effective item wording that will be interpreted consistently across raters. They also note that goodness of reliability should, in part, be based on the purpose of the assessment, with higher-stakes assessments requiring higher reliability and lower-stakes research assessments necessitating lower reliability. As a result, the authors state reliabilities as low as 0.70 are not uncommon. Based on these recommendations, we feel comfortable with the reported reliability levels. The resulting OTMS instrument can be found in the appendix.

Table 2
Test and Multiple Fit Statistics

Model	Parameters Estimated	Robust Test Statistic	CFI	TLI	RMSEA	SRMR
Baseline	80	1350.86	.77	.75	.06	.08
Single Factor	74	2529.20	.39	.36	.09	.13
Alt Model	70	724.49	.89	.88	.04	.06
Three Factor	51	354.91	.95	.94	.03	.05

Note. Presents the number of parameters estimated, test statistics with robust standard errors, and multiple fit statistics for each model.

Table 3 includes standardized and unstandardized factor loadings for the three-factor model. For each of the three factors, we also examined how alpha reliability would change were any one item to be removed. In nearly every case, removing an item would have had no effect, or made reliability go down.

Table 3
Unstandardized Loadings (Standard Errors), Standardized Loadings, and Significance Levels for Each Parameter in the CFA Model (N = 379)

Parameter Estimate	Unstandardized	Standardized	*p*
Loadings			
Support → Q6	1.00 (0.00)	0.399	--
Support → Q12	1.987 (0.341)	0.730	< .001
Support → Q15	1.539 (0.254)	0.619	< .001
Support → Q21	1.682 (0.276)	0.676	< .001
Support → Q24	1.914 (0.310)	0.753	< .001
Support → Q40	1.486 (0.221)	0.671	< .001
Support → Q25	1.720 (0.285)	0.699	< .001
Support → Q36	1.634 (0.286)	0.610	< .001
Support → Q37	1.574 (0.272)	0.623	< .001
Efficacy → Q7	1.00 (0.00)	0.614	--
Efficacy → Q10	0.984 (0.086)	0.692	< .001

Efficacy → Q14	1.105 (0.108)	0.735	< .001
Efficacy → Q22	0.777 (0.106)	0.530	< .001
Efficacy → Q31	0.974 (0.122)	0.591	< .001
Efficacy → Q35	0.661 (0.099)	0.474	< .001
Efficacy → Q38	1.116 (0.112)	0.678	< .001
Beliefs → Q8	1.00 (0.00)	0.755	--
Beliefs → Q9	0.919 (0.071)	0.679	< .001
Beliefs → Q11	0.914 (0.075)	0.705	< .001
Beliefs → Q23	0.774 (0.083)	0.543	< .001
Beliefs → Q27	0.815 (0.073)	0.565	< .001
Beliefs → Q29	0.901 (0.068)	0.714	< .001
Beliefs → Q33	1.197 (0.072)	0.854	< .001
Beliefs → Q41	1.000 (0.06)	0.804	< .001
Support → Efficacy	0.058 (0.012)	0.445	< .001
Efficacy → Beliefs	0.183 (0.026)	0.686	< .001
Support → Beliefs	0.038 (0.012)	0.233	< .001

Discussion

The resulting 24-item OTMS represents a valid and reliable research-based measure of teachers' motivation for online teaching that can be used to collect actionable data for K–12 teachers and educational leaders. When teachers gain insights into their own motivational beliefs, it allows them to identify areas for professional growth and learning. They can seek opportunities for professional development that will challenge them to evolve, cultivate, and advance their knowledge and understanding in targeted areas. When administrators gain insights into the motivational beliefs of the teachers at their schools, they can better align their support structures with the specific needs of each teacher. With limited resources (e.g., time, money, materials, training, and opportunities) administrators and educational leaders must be strategic in the selection of supports in which they invest time and money. By using the OTMS to understand which supports are wanted and needed, administrators and educational leaders can amplify the power of their limited resources by differentiating their support and targeting the specific needs of the teachers in their school or district.

The digital divide refers to the disparity that exists between people and communities living with online access and those living without (van Dijk, 2020). In the context of K–12 education, the digital divide includes both access to computers and the internet, as well as the knowledge to navigate online technology (Chandra et al., 2020). Since the COVID-19 pandemic, there has been an increase in technology accessibility for K–12 students, including an increase in schools using one-to-one technology. It is estimated that as of 2019, one-third of public schools in the U.S. had one-to-one technology programs in place (Gray & Lewis, 2021), and a majority reported having reliable internet access (Gray & Lewis, 2021). Additionally, as of 2019, 88% of 3 to 18-year-olds in the U.S. reported having home internet access via a computer, and another 6% reported having access through a smartphone (NCES, 2022). However, as K–12 schools continue to use the growing number of online resources in teaching and learning, it is imperative that teachers stay up to date on best practices for online teaching to provide the most effective learning experiences for students. The OTMS provides a way for K–12 administrators to learn more about teachers' motivation for online teaching and learning, thus providing data that can be used to later provide targeted professional development.

The Every Student Succeeds Act (ESSA) was signed by President Obama in 2015 and replaced the No Child Left Behind (NCLB) Act (2002)). The mission of the ESSA is to promote equity in education by protecting disadvantaged students, holding all students to high academic standards, expanding access to high-quality preschool, and maintaining an expectation for positive change in our lowest-performing schools (ESSA, 2015). "Educators can take advantage of the flexibility ESSA provides to expand the focus of their technology initiatives to include the intersection of accessibility, educational technology, and assistive technology. This expansion will enable educators to address gaps in student achievement and improve digital literacy through blended and personalized learning" (Crossland et al., 2018, p. 1). Digital technology is an integral part of our everyday lives and is embedded in our transportation, communications, and computing (Fishman & Dede, 2016). The ubiquity of technology places a responsibility on teachers to prepare students for a life with technology. As schools work to uphold the ESSA through technology-based student enrichment, online courses, social media, and interactive materials (Crossland et al., 2018) teachers must be willing to embrace the learning opportunities that come with the teaching of and with technology. The OTMS can be used strategically by school and district leaders to gather data regarding teachers' motivation for online teaching and learning. This information will allow administrators and school district leaders to make data-informed decisions related to the support, professional development, and training needed by teachers to fulfill the mission of the ESSA and better serve students.

Limitations

The OTMS was developed after examining prior research on online teaching and learning and validated as a tool to examine motivational constructs related to online teaching; however, it has not yet been used in practice to examine the relationships between teachers' motivation for online teaching and students' achievement or to predict teacher practice. It should be made clear that the OTMS instrument measures motivation for online teaching. Although the measured motivational factors are predictors of the willingness and readiness of teachers to teach in online learning environments, the instrument is not a predictor of effective practice. In addition, the OTMS is not intended to provide measures of online student achievement. Further, the OTMS

provides insight into possible targeted avenues of professional development but does not predict if such professional development will achieve the intended outcomes.

Future Research

Amid this rapid increase in the prevalence of online teaching, teachers can become overwhelmed by the quickening pace of progress. In recent years, K–12 schools in the U.S. have increasingly expanded the range and availability of online learning tools to aid student education within and beyond the traditional classroom (Ascione, 2021; Plitnichenko, 2021). With this growing accessibility of online educational resources, teachers are inundated with an ever-shifting landscape of tools to incorporate into their existing pedagogy (Ascione, 2021; Plitnichenko, 2021). While this access opens many pedagogical possibilities, it also brings the potential for teachers to become overwhelmed with the growing prevalence and use of online teaching and learning. When teachers begin to feel overwhelmed with the numerous possibilities offered via online teaching, they may choose to retreat to what is comfortable and known, the traditional face-to-face classroom. But as research has shown, many schools are continuing to use online learning as part of the school day and/or school year (e.g., on inclement weather days) and therefore, teachers need the tools and support to continue to make these online learning experiences as engaging, enriching, and meaningful as their traditional classroom lessons. It is critical to help keep teachers motivated to continue learning about and implementing best practices for online teaching. When teachers complete the OTMS, the results can offer a starting place for a conversation with fellow teachers and/or administrators for sharing ideas, challenges, and effective pedagogical practices.

Future research using the OTMS may open new avenues for exploring teachers' motivation for online teaching. Because multiple factors are assessed using the OTMS, it can be used to provide the foundation for focused investigations into individual factors identified on the scale. Findings from such studies could inform the development of a companion tool designed to guide the differentiated support provided to K–12 teachers engaging in online teaching. Further, exploration of the differences between the motivational needs of those who teach different grade levels could also be examined. The OTMS was administered to teachers of grades K–12 during the development of the instrument; however, as the OTMS becomes more widely used, it will be interesting to note if the reported motivation of teachers differs significantly between grade bands. Additionally, the OTMS could be further tested and validated for use as a supporting tool for those who study motivation for online teaching within international K–12 contexts.

The authors plan to disseminate the instrument widely so that school administrators, district-level specialists, and other individuals with decision-making power may use the instrument to inform the development of professional development and identify needed support systems for educators implementing online teaching and learning in their classrooms.

Declarations

The author declares no conflicts of interest associated with this article. The Office of Research Compliance at Clemson University determined that this study involving human participants met the criteria for exempt review. The authors would like to thank and acknowledge Clemson University's College of Education for supporting this work through the college's ADR Research Grant Program.

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Appendix A

Online Teaching Motivation Scale

Thank you for completing the Online Teaching Motivation Scale.

Directions: For each item, please answer to the best of your knowledge.
The first seven items are demographic items. There are then 24 multiple-choice items. For each of these items, think about your current online/virtual/hybrid teaching experience.

When thinking about online/virtual/hybrid, please consider any online teaching you use. This can include (but is not limited to):
*Virtual instruction
*e-learning days (e.g., inclement weather days)
*Students working on Chromebooks, iPads, or other technology devices during learning centers
*Students using Chromebooks, iPads, or other technology devices for assessment
*Students using learning apps (e.g., Dreambox, Epic, Kiddle, Flipgrid, Padlet, Google Docs, etc.)

If you utilize any virtual/online instruction in your classroom during normal in-person instructional hours we would consider this to be 'Online and Face-to-Face', or hybrid.

For the final 24 items (the non-demographic items), please indicate your level of agreement with each statement by selecting the appropriate response (Strongly Disagree (1), Disagree (2), Agree (3), Strongly Agree (4)).

Item	Question	Rating
	With which gender do you identify?	Male, Female, Non-binary, Other, Prefer not to answer
	In which state do you currently teach?	(write in)
	How many years have you been teaching?	(write in)
	What grade level do you teach?	Elementary, Middle, High, Other
	What is your teaching modality this year?	Face-to-face only Online and face-to-face/hybrid Online only
	In which school district do you teach?	(write in)
	Are you a STEM teacher or a teacher of a STEM content area?	(write in)
1	My administration supports me in modifying my online curriculum as necessary.	1 2 3 4
2	I am confident in my ability to effectively deliver content to my students online.	1 2 3 4
3	I believe that students can learn effectively in an online environment.	1 2 3 4
4	I believe students can learn as effectively through online instruction as through face-to-face instruction.	1 2 3 4

5	I am confident in my ability to make online learning engaging for my students.	1 2 3 4
6	I believe online instruction allows for meaningful interaction among students.	1 2 3 4
7	My administration provides adequate training to support my development as an online educator.	1 2 3 4
8	I am confident in my ability to respond to students' academic challenges in an online environment.	1 2 3 4
9	My administration provides the necessary materials for online teaching.	1 2 3 4
10	I have the appropriate technical support from my school to effectively deliver online instruction.	1 2 3 4
11	I am confident in my ability to manage my time effectively while teaching online.	1 2 3 4
12	I believe online education has increased equity in education.	1 2 3 4
13	My administration has well-defined expectations of me as an online educator.	1 2 3 4
14	My administration sets reasonable expectations for me as an online educator.	1 2 3 4
15	I believe that online learning is the best fit for some students.	1 2 3 4
16	I believe students are motivated to learn in an online environment.	1 2 3 4
17	I feel confident in my ability to manage student behavior in an online environment.	1 2 3 4
18	I believe online learning is an effective form of instruction for my students.	1 2 3 4
19	I am confident in my ability to use the technology required to teach in an online environment.	1 2 3 4
20	My administration provides constructive feedback about my online teaching.	1 2 3 4
21	My administration ensures I have a support system of other colleagues that I can contact for help during online teaching.	1 2 3 4
22	I am confident in my ability to formatively assess student learning in an online environment.	1 2 3 4
23	My administration is encouraging throughout the process of online teaching.	1 2 3 4
24	Online learning provides a positive learning environment for students.	1 2 3 4