

Advancing Oman Vision 2040 through Teacher Digital Readiness: Human and Organisational Drivers of E-Learning in Primary Schools

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ABSTRACT

Purpose - Oman Vision 2040 positions education, national capabilities and digital transformation as foundations of a knowledge-based and diversified economy. Against this policy background, this study develops and tests an integrated model of primary school teachers' readiness for e-learning in Oman. It examines human factors, financial readiness, organisational support and attitude, and tests whether attitude mediates the effects of the three antecedents on readiness. **Design/methodology/approach** - A cross-sectional survey was completed by 364 teachers from public and private primary schools across Oman's governorates. Proportional purposive sampling was used. Teachers' readiness was modelled as a higher-order construct comprising technical, lifestyle and pedagogical readiness; human factors comprised social competency, computer self-efficacy and technology adaptation; and organisational support comprised environmental, instructional and technical support. Data were analysed using IBM SPSS 26 and partial least squares structural equation modelling. **Findings** - Teachers reported moderate overall readiness, with pedagogical readiness exceeding technical and lifestyle readiness. Human factors strongly predicted readiness ($\beta = .876$, $p < .001$), while organisational support had a smaller positive effect ($\beta = .222$, $p = .004$). Both constructs also predicted attitude. Financial readiness and attitude did not directly predict readiness. Attitude nevertheless showed complementary partial mediation in the human factors-readiness and organisational support-readiness relationships. The model explained 79.7% of variance in readiness. **Originality/value** - The study translates Oman Vision 2040's education and digital-transformation ambitions into empirically testable school-level conditions. It shows that positive attitudes and budget availability are not sufficient: progress towards inclusive, future-ready education depends primarily on capable teachers working within supportive, performance-oriented institutions. The findings provide an evidence base for teacher development, governorate-sensitive school support and national coordination under Oman Vision 2040.

Keywords: teacher readiness; e-learning; digital transformation; human factors; organisational support; national capabilities; Oman Vision 2040; PLS-SEM

INTRODUCTION

The emergency move to remote education during the COVID-19 pandemic revealed that access to a digital platform is not equivalent to readiness to teach online. Emergency remote teaching is a temporary response to crisis, whereas well-designed online education requires deliberate pedagogical planning, appropriate infrastructure and sustained institutional support (Hodges et al., 2020). Teachers were required to redesign lessons, communicate through unfamiliar platforms, maintain student participation, conduct assessment and resolve technical problems, often from home and with little preparation. This abrupt change made teacher readiness a central condition of educational continuity.

Readiness is particularly consequential in primary schools. Young learners require intensive guidance, frequent interaction and developmentally appropriate activities. Online assessment is also complicated by parental involvement and by the difficulty of observing affective and behavioural learning at a distance. For teachers, the transition combines technical

demands with a change in work routines, communication practices and pedagogy. Readiness must therefore be understood as a multidimensional capability rather than a single favourable opinion about technology (Hung, 2016; Martin, Budhrani, & Wang, 2019).

Oman offers a significant context for examining these issues. Research in Omani education has documented challenges involving digital infrastructure, implementation barriers, teacher preparation and institutional guidance (Al-Naabi & Al-Abri, 2021; Al Hasani & Husin, 2021; Magd & Jonathan, 2023). Yet much of the empirical work has concentrated on higher education, individual institutions or isolated determinants. Evidence covering public and private primary schools and linking personal, financial and organisational conditions remains limited. This omission matters because the school system spans different governorates and serves urban and rural communities whose technological conditions may differ.

The policy relevance extends beyond the pandemic. Oman Vision 2040, the Sultanate's national development framework for 2021-2040, identifies education, learning, scientific research and national capabilities as a central priority. It calls for inclusive education, lifelong learning and a knowledge-based society, while its governance agenda seeks digitally enabled, responsive and performance-oriented public institutions (Oman Vision 2040 Implementation Follow-up Unit, n.d.). Within this framework, teacher digital readiness is not a narrow technology-adoption issue. It is part of the national capability infrastructure needed to widen educational access, sustain learning during disruption, improve public-sector performance and prepare young Omanis for a technology-enabled, diversified economy. Recent Omani work on AI and gamification likewise shows that teacher readiness continues to shape the adoption of new technology tools (Al-Musawi et al., 2024).

This study addresses both an empirical gap and a national implementation need by testing an integrated model in which human factors, financial readiness and organisational support predict teachers' readiness directly and indirectly through attitude. Human factors combine social competency, computer self-efficacy and technology adaptation. Organisational support combines environmental, instructional and technical support. Readiness is measured through technical, lifestyle and pedagogical dimensions. These dimensions provide actionable indicators for Oman Vision 2040 because they distinguish teachers' capability from the institutional and working conditions that allow capability to be used. The study asks four questions: (1) What is the level of primary school teachers' readiness for e-learning in Oman? (2) Which factors predict readiness? (3) Which factors predict attitude? and (4) Does attitude mediate the relationships between the antecedents and readiness?

The article makes three contributions. First, it offers broad school-level evidence from 364 teachers across public and private schools, with representation from rural and urban areas, thereby supporting Vision 2040's concern with balanced development across governorates. Second, it joins Social Cognitive Theory (SCT) and the Theory of Reasoned Action (TRA) to examine readiness as an interaction between capability, environment and attitude. Third, it provides a counterpoint to attitude-centred explanations: attitude is not a significant direct predictor, although it participates in indirect pathways when personal capability and organisational support are present. This distinction helps shift implementation attention from symbolic technology adoption towards measurable teacher capability and institutional performance.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Teachers' readiness for e-learning

Teachers' readiness refers to their preparedness to undertake online teaching effectively. It includes access to appropriate hardware and connectivity, confidence and skill in using digital tools, the ability to design and facilitate online learning, and the work conditions needed to sustain these activities. Hung (2016) emphasised the multidimensional character of readiness, while Martin, Budhrani, and Wang (2019) showed that readiness encompasses course design, communication, time management and technical competence. The present study distinguishes technical readiness, lifestyle readiness and pedagogical readiness. Technical readiness concerns devices, software, connectivity and support. Lifestyle readiness concerns time, space, routine and access to help. Pedagogical readiness concerns motivation, independence, communication and the ability to teach without reliance on a conventional classroom.

This distinction prevents a common interpretive error. A teacher can be pedagogically confident but constrained by an inadequate device, unstable internet access or lack of a private workspace. Conversely, technology access does not guarantee the ability to design engaging learning. Readiness emerges from the alignment of these dimensions.

Theoretical foundation

SCT explains behaviour through reciprocal relationships among personal factors, behaviour and environment (Bandura, 1986). Computer self-efficacy and technology adaptation represent personal beliefs and capabilities; social competency reflects the capacity to communicate and sustain participation; and organisational support represents the enabling

environment. SCT therefore predicts that teacher readiness should improve when personal capability and institutional conditions reinforce one another.

TRA explains behaviour as linked to beliefs, attitude and intention (Fishbein & Ajzen, 1975). In digital education, favourable attitudes can encourage teachers to engage with new platforms. However, an attitude may not translate into performance when resources, skills or organisational support are missing. Integrating SCT and TRA permits attitude to be tested as both an outcome of contextual and personal factors and a pathway toward readiness, rather than presuming that a favourable attitude is sufficient.

Human factors and readiness

Human factors comprise social competency, computer self-efficacy and technology adaptation. Social competency enables clear communication, constructive feedback and participation in an environment where informal classroom cues are reduced. Computer self-efficacy reflects teachers' beliefs that they can use devices, applications and digital resources successfully. Technology adaptation refers to the ability to learn unfamiliar tools and modify practice as technologies change. Prior work links self-efficacy and digital competence to technology integration and online teaching readiness (Kim et al., 2013; König et al., 2020; Pellas, 2014). A recent scoping review similarly found that self-efficacy and digital competence reinforce one another and are shaped by practice, professional development, collaboration and institutional support (Hu et al., 2025). These arguments yield:

H1. Human factors positively influence teachers' readiness for e-learning.

Human capability should also shape how teachers evaluate e-learning. Teachers who can operate digital tools, adapt to change and communicate effectively are more likely to form favourable attitudes because the technology presents a manageable rather than threatening task.

H5. Human factors positively influence teachers' attitudes toward e-learning.

Financial readiness

E-learning involves direct and indirect costs: devices, internet subscriptions, software, electricity, platform development, maintenance and technical personnel. Schools with adequate budgets can acquire and sustain these resources, while financially constrained schools may shift costs to teachers. Financial readiness should therefore improve the conditions under which online teaching occurs and may reduce teachers' frustration with e-learning.

H2. Financial readiness positively influences teachers' readiness for e-learning.

H6. Financial readiness positively influences teachers' attitudes toward e-learning.

Organisational support

Organisational support includes environmental, instructional and technical support. Environmental support involves leadership, infrastructure, policy and a school climate that values technology-enabled teaching. Instructional support assists teachers in redesigning content, activities and assessment for online delivery. Technical support provides timely help with devices, software and connectivity. Research consistently identifies leadership, feedback, professional development and technical assistance as conditions of successful digital teaching (Almpanis, 2015; King & Boyatt, 2014; Philipsen et al., 2019; Rapanta et al., 2020). More recent evidence shows that institutional support can strengthen teachers' digital self-efficacy and engagement while reducing negative emotions (Liu, Sun, & Cui, 2025). Accordingly:

H3. Organisational support positively influences teachers' readiness for e-learning.

H7. Organisational support positively influences teachers' attitudes toward e-learning.

Attitude and its mediating role

Attitude reflects a favourable or unfavourable evaluation of using e-learning. Positive attitudes are often treated as precursors to technology use because they influence willingness to engage, persist and experiment. Some empirical studies report a strong association between attitude and readiness, although the relationship varies across contexts and measurement models. The inconsistency suggests that attitude may operate conditionally: it can energise action but cannot supply missing competence or institutional capacity.

H4. Attitude positively influences teachers' readiness for e-learning.

TRA suggests that the influence of capabilities and support may partly operate through attitude. Human factors can make e-learning feel controllable and useful, while organisational support can reduce difficulty and signal institutional commitment. Financial support may reduce the personal burden of participation. Thus:

H8. Attitude mediates the relationship between human factors and teachers' readiness.

H9. Attitude mediates the relationship between financial readiness and teachers' readiness.

H10. Attitude mediates the relationship between organisational support and teachers' readiness.

METHOD

Research design and participants

A quantitative, cross-sectional survey design was used. The population comprised teachers in public and private primary schools in Oman. A minimum sample of 364 was established using G*Power, and proportional purposive sampling was applied to reflect teacher numbers across governorates. The final analytic sample contained 364 complete responses. The unit of analysis was the individual teacher.

Table 1. Respondent profile (n = 364)

Characteristic	Category	n	%
Gender	Male / Female	214 / 150	58.8 / 41.2
Age	19-24 / 25-29 / 30-34 / 35-39 / ≥40	61 / 61 / 105 / 88 / 49	16.8 / 16.8 / 28.8 / 24.2 / 13.5
Nationality	Omani / Egyptian / Jordanian / Tunisian	170 / 76 / 82 / 36	46.7 / 20.9 / 22.5 / 9.9
School type	Public / Private	247 / 117	67.9 / 32.1
Residential area	Rural / Urban	207 / 157	56.9 / 43.1
Teaching cycle	First / Second / Third	124 / 160 / 80	34.1 / 44.0 / 21.9
Subject	Science / Mathematics / Islamic Studies / English / Other	65 / 90 / 79 / 108 / 22	17.9 / 24.7 / 21.7 / 29.7 / 6.0

The sample included teachers working in both major school sectors and had meaningful rural representation. The inclusion of expatriate teachers reflects the composition of Oman's education workforce. Among respondents, 75.5% reported that they liked teaching online and 72.8% used an online platform supplied by their school.

Instrument and measures

The questionnaire consisted of demographic items and multi-item measures using five-point Likert-type response options. Teachers' readiness was specified as a higher-order construct with technical, lifestyle and pedagogical dimensions. Human factors comprised social competency, computer self-efficacy and technology adaptation. Organisational support comprised environmental, instructional and technical support. Financial readiness measured the adequacy of school budgets and resources for e-learning. Attitude captured teachers' evaluation of e-learning use.

Items were adapted from established literature and reviewed for content validity. A pre-test involved subject and language experts, including education specialists in Oman. A pilot study with 40 teachers who were not included in the final sample produced Cronbach's alpha values from .761 to .937, supporting further administration.

The item-development and adaptation sequence comprised four stages. First, the research team mapped each item to its intended construct and retained wording consistent with the construct definitions. Second, references to higher-education faculty, university systems or generic online learning were recast for primary-school teachers, school-provided platforms, young learners and the Omani school setting. Third, education and language specialists reviewed conceptual equivalence, clarity, cultural appropriateness and relevance to public and private primary schools. Fourth, feedback from the pre-test

and the 40-teacher pilot was used to simplify ambiguous wording and confirm the response format before the main survey. These changes were contextual rather than conceptual: the intended meaning and construct membership of the source items were retained.

Appendix A reproduces the complete questionnaire administered in the study. It reports the response scale, demographic questions, item codes, exact administered wording, construct membership and original source studies. The instrument contained 60 Likert-scale items: 15 for teachers' readiness, 15 for human factors, five for financial readiness, 15 for organisational support and 10 for attitude.

Data collection and analysis

The questionnaire was distributed online. Participation was voluntary and respondents were informed of the academic purpose of the research. Data were analysed with IBM SPSS Statistics 26 and PLS-SEM. Screening covered missing data, outliers, normality, linearity, homoscedasticity and multicollinearity. No problematic multivariate outliers were identified; skewness and kurtosis were within the stated acceptable range; and VIF values did not indicate critical collinearity.

The two-stage PLS-SEM procedure first assessed the measurement model through indicator loadings, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE) and discriminant validity. The structural model was evaluated through path coefficients, bootstrapped significance, coefficients of determination (R^2) and predictive relevance (Q^2). Mediation was evaluated using bootstrapped indirect effects and the classification proposed by Zhao, Lynch, and Chen (2010).

PLS-SEM was selected because the study's primary purpose was prediction and explanation of variance in teachers' readiness, the model included multiple mediated paths and three multidimensional higher-order constructs, and the analysis required simultaneous estimation of the measurement and structural components. PLS-SEM is suitable for such prediction-oriented composite models and does not impose multivariate-normality assumptions as strictly as covariance-based SEM (Hair et al., 2019, 2020). The choice was therefore driven by the research objective and model structure, rather than sample size alone.

The higher-order specifications reflect the theory and the level at which the research questions are posed. Teachers' readiness is expressed through technical, lifestyle and pedagogical readiness; human factors through social competency, computer self-efficacy and technology adaptation; and organisational support through environmental, instructional and technical support. Treating each umbrella concept as a higher-order construct preserves these distinct dimensions while permitting a parsimonious test of their overall relationships with attitude and readiness. A two-stage approach was used so that the first-order dimensions were estimated first and their latent-variable scores then served as indicators of the corresponding higher-order construct, reducing model complexity and avoiding repeated use of all lower-order indicators (Becker et al., 2012; Sarstedt et al., 2019).

RESULTS

Level of teachers' readiness

Teachers reported moderate overall readiness ($M = 3.307$). Pedagogical readiness was highest ($M = 3.8537$), followed by technical readiness ($M = 3.0769$) and lifestyle readiness ($M = 2.9918$). The pattern suggests that teachers were more confident about the pedagogical role than about the equipment, connectivity, time, workspace and immediate assistance needed to sustain online work.

Table 2. Descriptive results for teachers' readiness

Construct/dimension	Mean	Rank
Overall teachers' readiness	3.307	-
Pedagogical readiness	3.8537	1
Technical readiness	3.0769	2
Lifestyle readiness	2.9918	3

Measurement model

At the higher-order stage, indicator loadings ranged from .703 to .953. Cronbach's alpha values ranged from .720 to .948, CR values from .772 to .954, and AVE values from .679 to .785. All exceeded the thresholds used in the study. HTMT ratios ranged from .681 to .886 and remained below .90, supporting discriminant validity.

Particular attention was paid to the empirical distinction between human factors and teachers' readiness because both refer to teacher capability and the structural relationship was very strong ($\beta = .876$). Conceptually, human factors represent antecedent resources and beliefs—social competency, computer self-efficacy and adaptability—whereas readiness represents preparedness to perform e-learning under technical, lifestyle and pedagogical conditions. Empirically, the HTMT assessment supported this distinction: all ratios were below the .90 criterion, although the largest value (.886) was close to that boundary (Henseler, Ringle, & Sarstedt, 2015). The finding therefore supports discriminant validity under the stated criterion but warrants cautious interpretation; the large path may partly reflect the proximity of capability-related content across the constructs. Future validation should use item-level cross-loading inspection, HTMT confidence intervals and alternative model comparisons, alongside behavioural measures that are less dependent on self-report.

Table 3. Reliability and convergent validity

Construct	Cronbach's α	CR	AVE
Human factors	.948	.954	.679
Financial readiness	.904	.923	.706
Organisational support	.808	.844	.683
Attitude	.720	.772	.785
Teachers' readiness	.928	.938	.703

Note. CR = composite reliability; AVE = average variance extracted.

Structural model and hypothesis tests

The model explained 79.7% of the variance in teachers' readiness ($R^2 = .797$) and 37.1% of the variance in attitude ($R^2 = .371$). Q^2 values were .774 for readiness and .454 for attitude, indicating predictive relevance within the study's blindfolding assessment.

Table 4. Direct effects

Hypothesis	Structural path	β	t	p	Decision
H1	Human factors → readiness	.876	11.476	< .001	Supported
H2	Financial readiness → readiness	.054	.672	.511	Not supported
H3	Organisational support → readiness	.222	2.942	.004	Supported
H4	Attitude → readiness	.106	1.200	.282	Not supported
H5	Human factors → attitude	.535	4.049	< .001	Supported
H6	Financial readiness → attitude	.104	.717	.504	Not supported
H7	Organisational support → attitude	.346	2.999	.004	Supported

Human factors were the dominant direct predictor of readiness. Organisational support also contributed positively. Financial readiness and attitude did not have statistically significant direct effects. Human factors and organisational support both predicted attitude, while financial readiness did not.

Table 5. Indirect effects through attitude

Hypothesis	Indirect path	β	t	p	Decision
H8	Human factors → attitude → readiness	.732	3.527	.001	Supported
H9	Financial readiness → attitude → readiness	.011	.527	.598	Not supported
H10	Organisational support → attitude → readiness	.648	3.241	.001	Supported

Because the relevant direct and indirect effects were positive and significant, attitude showed complementary partial mediation between human factors and readiness and between organisational support and readiness. No mediation was found for financial readiness.

DISCUSSION

Readiness is uneven across dimensions

The moderate overall score conceals an important imbalance with direct relevance to Oman Vision 2040. Pedagogical readiness was relatively strong, whereas technical and lifestyle readiness were weaker. Teachers may understand their instructional role and remain willing to communicate with pupils, yet still lack an adequate device, reliable dedicated internet connection, uninterrupted time, private workspace or nearby technical assistance. This reinforces the argument that readiness is not a general psychological state. It is the practical alignment of pedagogy, technology and working conditions. Unless this imbalance is addressed, digital transformation may expand platform availability without producing the inclusive, high-quality learning envisaged by the Vision.

The distinction also explains why high platform use and favourable preferences should not be interpreted as full preparedness. Most respondents used a school-provided platform and three-quarters liked online teaching, but the total readiness level remained moderate. System leaders should therefore avoid using login rates or attitudinal surveys as the sole indicators of readiness.

Human capability is the central driver

Human factors had the strongest relationship with readiness. The result supports SCT: self-efficacy, adaptive capability and social competence enable teachers to act within a changing environment. Computer self-efficacy helps teachers troubleshoot and work independently; technology adaptation enables them to learn unfamiliar applications; and social competency helps preserve feedback, participation and a sense of community online. The finding is consistent with evidence that competence and self-efficacy are mutually reinforcing and that repeated practice strengthens both (Hu et al., 2025).

The magnitude of this relationship ($\beta = .876$) is substantively notable and should not be interpreted only as evidence of a powerful causal driver. The two constructs occupy neighbouring conceptual territory: self-efficacy and adaptation concern perceived capability, while technical and pedagogical readiness also capture perceived capacity to teach online. The acceptable HTMT results indicate that they were distinguishable in the estimated model, but the near-threshold maximum ratio and common self-report method leave open the possibility of shared content, common-method inflation or both. Accordingly, the coefficient is best interpreted as a strong association between capability resources and readiness within this measurement system. Replication with objective competence indicators and explicit comparison of nested or alternative measurement models is needed to establish how much of the association is substantive rather than measurement-related.

This result has a direct policy implication for the Vision 2040 priority of developing national capabilities. Training should move beyond basic computer literacy. Teachers need repeated practice in designing online and blended lessons, selecting tools for pedagogical purposes, managing synchronous and asynchronous interaction, creating accessible content, assessing learning and resolving common technical problems. One-off workshops are unlikely to produce adaptive competence. Competency-based professional development, assessed through demonstrated classroom practice, would connect teacher learning more clearly to the Vision's goals for lifelong learning, innovation and labour-market-relevant skills.

Organisational support converts capability into practice

Organisational support predicted both readiness and attitude. Teachers work within systems: leadership priorities, platform reliability, technical response, instructional guidance, peer collaboration and feedback affect whether individual competence can be used. The finding echoes research that identifies institutional support as both a technical and psychological resource (Liu et al., 2025). It also supports the professional-development literature, which emphasises coherent policy, sustained assistance and opportunities to redesign practice rather than isolated exposure to tools (Philipsen et al., 2019).

Instructional support deserves particular attention. Technical help may restore access, but it does not show a teacher how to redesign an assessment, maintain young learners' attention or provide meaningful online feedback. Schools require instructional-design support alongside help desks and infrastructure.

Why attitude and finance were not sufficient

Attitude did not directly predict readiness. This does not mean attitude is irrelevant. Rather, the mediation results show that attitude contributes when it is connected to human capability and organisational support. A teacher may believe that e-learning is valuable but remain unready because of inadequate skills, connectivity or assistance. The finding qualifies attitude-centred models and underscores an attitude-behaviour gap under constrained conditions.

The non-significant financial paths require similarly careful interpretation. Teachers reported costs associated with internet access, electricity and materials, and schools need resources to sustain digital systems. The result should not be read as evidence that funding is unnecessary. It indicates that financial readiness, as perceived in this model, does not automatically translate into teacher readiness. Resources generate value when converted into devices, connectivity, professional learning, instructional design and technical services. Some teachers may also have absorbed personal costs because teaching continued mandatorily during the crisis, weakening the statistical link between school finance and their behaviour.

Theoretical implications

The study contributes theoretically in four ways. First, it supports SCT by showing that personal capability and organisational environment predict readiness. Second, it refines TRA in this context: attitude is neither a sufficient direct explanation nor irrelevant, but a complementary mechanism embedded in stronger capability and support pathways. Third, it models readiness as a higher-order outcome that includes lifestyle alongside pedagogy and technology. Fourth, it introduces financial readiness into the integrated model and demonstrates the importance of distinguishing resource availability from resource conversion.

The combined model shifts the unit of explanation from the individual teacher alone to the teacher-in-school system. This is important because digital transformation often fails when institutions frame adoption as a matter of willingness while leaving structural barriers intact.

Practical implications and Oman Vision 2040

The findings support several connected priorities of Oman Vision 2040. Most directly, they address People and Society through education, learning, scientific research and national capabilities. They also support Governance and Institutional Performance because successful digital education requires responsive, digitally enabled and performance-oriented institutions. By developing teachers who can prepare pupils for a knowledge- and technology-intensive economy, the findings further contribute indirectly to economic diversification and productive employment. Finally, the governorate-level differences implied by Oman's geography make teacher readiness relevant to balanced regional development. Five actions follow from the evidence.

First, the Ministry of Education and teacher-development providers should establish a compulsory, competency-based digital pedagogy pathway aligned with Oman Vision 2040 and successive five-year development plans. Certification should require demonstrated practice, not attendance alone. Second, every school should maintain a minimum support standard covering device access, reliable connectivity, instructional guidance, technical response and peer mentoring. Third, readiness should be monitored by governorate, school sector and rurality so that disparities are visible and resources can be differentiated. Fourth, national coordination could be strengthened through a fully operational National E-Learning Centre responsible for standards, training, research and development, quality assurance, accreditation, content repositories and learning-continuity planning. Fifth, teacher-readiness indicators should be incorporated into institutional performance monitoring so that implementation is assessed through capability and classroom use rather than expenditure or platform access alone.

Public-private cooperation can support these actions and reflects Vision 2040's emphasis on a stronger private-sector role. Telecommunications and ICT providers can contribute affordable connectivity, service coverage, devices and technical expertise, particularly in underserved governorates. Such partnerships should be governed by educational needs, privacy, accessibility, interoperability and measurable outcomes. A national teacher-readiness dashboard could track technical, lifestyle and pedagogical indicators, competency certification, support-response times and rural-urban gaps rather than relying on platform participation alone. This would turn the study's model into a practical monitoring framework for Vision 2040 implementation.

Limitations and Future Research

The study has limitations. First, its cross-sectional design identifies associations and indirect effects but cannot establish temporal ordering or change. Future work should use longitudinal panels or repeated-measures designs, particularly before and after professional-development or infrastructure interventions, to test whether improvements in capability and school support are followed by sustained gains in readiness. Second, all focal measures were self-reported and may be affected by common-method variance, social desirability and conceptual proximity among capability-related constructs. Subsequent studies should triangulate teacher perceptions with observed digital teaching competence, structured classroom-observation records, platform logins and activity traces, digital lesson and assessment quality, actual classroom practices, and student engagement and learning outcomes. Third, proportional purposive sampling broadened coverage but did not provide known selection probabilities. Stratified probability sampling using governorate, school sector and rurality as strata would provide a firmer basis for population inference.

Fourth, the study included public and private schools and rural and urban teachers, but subgroup comparisons were not estimated because the purposive design and available subgroup cells were not planned to establish measurement invariance and adequate power for all comparisons. This prevents conclusions about whether the path coefficients differ by school sector, rurality or governorate. A follow-up study should pre-specify these comparisons, secure adequate probability samples within each stratum, establish measurement invariance, and then apply multi-group analysis to compare public versus private schools, rural versus urban teachers and governorates. Replication should also extend to secondary schools, vocational education and higher education. Fifth, future models could incorporate leadership, motivation, continuous professional development, self-directed learning, digital well-being and technology-related emotions, with student and parent perspectives providing a fuller account of system readiness. Finally, because data were gathered in a pandemic-related context, post-pandemic replication is necessary as technology access, experience and institutional arrangements evolve.

CONCLUSION

This study examined the personal and institutional foundations of e-learning readiness among 364 primary-school teachers in Oman and considered their significance for Oman Vision 2040. Teachers were moderately ready overall and more prepared pedagogically than technically or in their working lifestyles. Human factors were the strongest predictor of readiness, while organisational support made an additional positive contribution. Positive attitude did not directly produce readiness, and financial readiness alone was insufficient. Attitude instead strengthened the pathways from human capability and organisational support.

The central conclusion is straightforward: the digital education capability required by Oman Vision 2040 must be built, supported and measured. It develops when competent and adaptable teachers work within schools that provide leadership, instructional guidance, technical support and reliable infrastructure. Investment should therefore be judged by whether it produces demonstrable teacher competence, equitable support across governorates and sustained improvements in teaching practice, not merely by whether platforms and budgets exist. Framed in this way, teacher readiness becomes a measurable bridge between the Vision's education priority, digitally enabled institutional performance and the longer-term development of a knowledge-based, diversified economy.

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Declarations

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Ethics approval and informed consent: The study protocol was reviewed and approved by the university ethics committee. Participation was voluntary. Before beginning the questionnaire, respondents received information about the study's academic purpose, confidentiality, data use and their right to decline or withdraw, and provided informed consent. No personally identifying information is reported.

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Appendix A. Complete Questionnaire

The questionnaire was administered in English to primary-school teachers in Oman. The wording below is reproduced as administered so that readers can evaluate the operationalisation of each construct. Items were adapted to the Omani school context through references to teachers, schools, students, online platforms and school-based support. Subject and language experts reviewed the instrument, and a pilot test was conducted with 40 teachers before the main survey.

Response scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; and 5 = Strongly Agree.

A1. Instrument Structure and Sources

Construct	Dimension(s)	Items	Original source(s)
Teachers' readiness	Technical, lifestyle and pedagogical readiness	15	Briones (2021); Cruz and Catura (2020); Gay (2016); Zou et al. (2021)
Human factors	Social competency, computer self-efficacy and technology adaptation	15	König et al. (2020); Swank et al. (2021); Loar (2018); Lucas et al. (2021); Sacramentom et al. (2021)
Financial readiness	Financial readiness	5	Mirabolghasemi et al. (2019); Nwagwu (2020)
Organisational support	Environmental, instructional and technical support	15	Lay and Ye (2022); Araneta et al. (2020)
Attitude	E-learning usage attitude	10	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)

A2. Section A: Demographic Profile

Instruction: Please tick (✓) the most appropriate answer relevant to your personal information.

No.	Question	Response options
1	Gender	Male; Female.
2	Type of organisation	Private; Public.
3	Do you like to teach online?	Yes; No.
4	Where are you staying?	Village; City.
5	Do you use an online learning system in your school?	Yes; No.
6	Network provider	Omantel; Ooredoo; Awasr; Other (please specify).
7	Stage of students	First Cycle; Second Cycle; Third Cycle.
8	Age	19–24 years; 25–29 years; 30–34 years; 35–39 years; 40 years and above.
9	Nationality	Omani; Egyptian; Jordanian; Tunisian; Other (please specify).
10	Subject taught	Science; Mathematics; Islamic Studies; English Language; Other (please specify).
11	Governorate/region of work	Muscat; Al Dakhiliyah; Musandam; Al Batinah; Al Wusta; Dhofar; Al Sharqiyah.

A3. Section B: Teachers' Readiness

Technical readiness

Code	Item	Original source(s)
TR1	I know how to access the online help desk.	Briones (2021); Cruz & Catura (2020); Gay

		(2016); Zou et al. (2021)
TR2	My computer setup is sufficient for online learning.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
TR3	I have access to software such as word processor, spreadsheet, or browser.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
TR4	I have access to a dedicated network connection or have an Internet Service Provider/ISP.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
TR5	I get adequate technical support from the school to perform various e-learning activities.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)

Lifestyle readiness

Code	Item	Original source(s)
LR1	I have a private place in my home or at work and that I can use for extended periods.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
LR2	I have adequate time that will be uninterrupted in which I can work on my online courses.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
LR3	I routinely communicate with persons by using electronic technologies such as e-mail and voice mail.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
LR4	I have persons and/or resources nearby who will assist me with any technical problems I might have with my software applications as well as my computer hardware.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
LR5	I value and/or need flexibility, for example, it is not convenient for me to come to campus two to three times a week to attend a traditional class.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)

Pedagogical readiness

Code	Item	Original source(s)
PR1	When I am asked to use technologies that are new to me, I am eager to try them.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)

Code	Item	Original source(s)
PR2	I am a self-motivated, independent learner.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
PR3	It is not necessary that I be in a traditional classroom in order to teach.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
PR4	I am comfortable providing written feedback rather than giving immediate verbal feedback.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)
PR5	I can communicate effectively verbally.	Briones (2021); Cruz & Catura (2020); Gay (2016); Zou et al. (2021)

A4. Section C: Human Factors

Social competency

Code	Item	Original source(s)
SC1	I am able to demonstrating knowledge and skills for using e-learning in ethical, legal and safe ways.	König et al. (2020); Swank et al. (2021)
SC2	I maintain continuous, positive and constructive feedback to encourage student participation in using e-learning.	König et al. (2020); Swank et al. (2021)
SC3	I am able to use humour and good manners during the teaching and learning process via e-learning.	König et al. (2020); Swank et al. (2021)
SC4	I am able to demonstrate knowledge and skills for acquiring and processing learning resource with technology tools.	König et al. (2020); Swank et al. (2021)
SC5	I set a trustful atmosphere for communication with students via e-learning.	König et al. (2020); Swank et al. (2021)

Computer self-efficacy

Code	Item	Original source(s)
CSE1	I find working with computers very easy.	Loar (2018); Lucas et al. (2021)
CSE2	I am very sure of my abilities to use computers.	Loar (2018); Lucas et al. (2021)

Code	Item	Original source(s)
CSE3	I enjoy working with computers.	Loar (2018); Lucas et al. (2021)
CSE4	I can usually deal with most difficulties I encounter when using computers.	Loar (2018); Lucas et al. (2021)
CSE5	I do not have difficulties when trying to learn how to use a new software.	Loar (2018); Lucas et al. (2021)

Technology adaptation

Code	Item	Original source(s)
TA1	My students understand better when I use various online platforms in delivering my lessons.	Sacramentom et al. (2021)
TA2	I fully understand and accept in my heart that as a teacher in the new normal, I need to utilise various online platforms to deliver my lessons.	Sacramentom et al. (2021)
TA3	I equip myself to be fit for the online classes to be part of our school's requirement.	Sacramentom et al. (2021)
TA4	I can assist my colleague to make teaching and learning resources fit for online classes.	Sacramentom et al. (2021)
TA5	I design my teaching and learning materials based on the diverse situation of my students.	Sacramentom et al. (2021)

A5. Section D: Financial Readiness

Financial readiness

Code	Item	Original source(s)
FR1	My school has a budget for an e-learning management system.	Mirabolghasemi et al. (2019); Nwagwu (2020)
FR2	My school is willing to buy a computer for teaching via e-learning purposes.	Mirabolghasemi et al. (2019); Nwagwu (2020)
FR3	My school is willing to spend extra money on teaching via e-learning.	Mirabolghasemi et al. (2019); Nwagwu (2020)
FR4	My school is willing to buy an internet packet for teaching via e-learning.	Mirabolghasemi et al. (2019); Nwagwu (2020)

FR5	My school will reduce the cost in service delivery by using e-learning.	Mirabolghasemi et al. (2019); Nwagwu (2020)
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A6. Section E: Organisational Support

Environmental support

Code	Item	Original source(s)
ES1	My school ensures that I have enough planning time.	Lay & Ye (2022); Araneta et al. (2020)
ES2	My school keeps me informed of school and facility events.	Lay & Ye (2022); Araneta et al. (2020)
ES3	My school arranges my schedule in a way to reduce the time I spend on paperwork and in meetings.	Lay & Ye (2022); Araneta et al. (2020)
ES4	My school makes sure that I have the space I need to teach and plan.	Lay & Ye (2022); Araneta et al. (2020)
ES5	My school assigns me to work with students for whom I am trained and certified to teach.	Lay & Ye (2022); Araneta et al. (2020)

Instructional support

Code	Item	Original source(s)
IS1	My school gives me information about modifying instruction to suit with e-learning.	Lay & Ye (2022); Araneta et al. (2020)
IS2	My school gives me information about instrumental techniques that will help improve my teaching via e-learning.	Lay & Ye (2022); Araneta et al. (2020)
IS3	My school helps me select appropriate instructional materials.	Lay & Ye (2022); Araneta et al. (2020)
IS4	My school gives me information on ways to make my instruction via e-learning meaningful.	Lay & Ye (2022); Araneta et al. (2020)
IS5	My school helps me pick the right instructional programs for my students.	Lay & Ye (2022); Araneta et al. (2020)

Technical support

Code	Item	Original source(s)
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TS1	My school provides me with reliable feedback about my teaching performance via e-learning.	Lay & Ye (2022); Araneta et al. (2020)
TS2	My school provides me with reliable feedback about the assessments I conduct with my students.	Lay & Ye (2022); Araneta et al. (2020)
TS3	My school provides me with reliable input about the progress reports I write on my students.	Lay & Ye (2022); Araneta et al. (2020)
TS4	My school gives me reliable information about due dates for my subject (test and final examination).	Lay & Ye (2022); Araneta et al. (2020)
TS5	My school helps me get assistive technology devices for my students.	Lay & Ye (2022); Araneta et al. (2020)

A7. Section F: E-Learning Usage Attitude

Attitude

Code	Item	Original source(s)
AT1	e-Learning can solve many of our educational problems.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT2	e-Learning will bring new opportunities for organizing teaching and learning.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT3	e-Learning saves time and effort for both teachers and students.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT4	e-Learning increases access to education and training.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT5	e-Learning will increase my efficiency in teaching.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT6	e-Learning enables collaborative learning.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT7	e-Learning can engage learners more than other forms of learning.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT8	e-Learning increases the quality of teaching and learning because it integrates all forms of media, such as print, audio, video, and animation.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)

AT9	e-Learning increases the flexibility of teaching and learning.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)
AT10	Schools should adopt more and more e-learning for their students.	Akbarilakeh et al. (2019); Al-Dlalah et al. (2021)

A8. Open-Ended Question

What is your suggestion to improve teachers' readiness towards e-learning?