

Vocational Special Education Teachers' Competency in Implementing Digital Learning for Students with Special Educational Needs

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ABSTRACT

The rapid advancement of digital technology has significantly transformed teaching and learning practices across educational settings, including vocational special education. The integration of digital learning provides opportunities for more flexible, interactive, and student-centred instructional approaches that can accommodate the diverse needs of students with special educational needs (SEN). However, successful implementation depends largely on teachers' competency and their ability to overcome various technological and instructional challenges. Therefore, this study aimed to determine the level of competency among vocational special education teachers in implementing digital learning, identify the challenges encountered during implementation, and examine the relationship between digital learning challenges and teacher competency.

A quantitative descriptive survey design was employed involving 96 vocational special education teachers in Johor, Malaysia. Data were collected using a structured questionnaire developed based on Spencer and Spencer's Competency Theory and the Unified Theory of Acceptance and Use of Technology (UTAUT). Descriptive statistics and Pearson correlation analyses were conducted using Statistical Package for the Social Sciences (SPSS).

The findings revealed that vocational special education teachers demonstrated a very high level of competency ($M = 4.33$, $SD = 0.59$). The level of challenges experienced in implementing digital learning was also very high ($M = 4.36$, $SD = 0.66$). Furthermore, Pearson correlation analysis indicated a significant positive relationship between digital learning challenges and teacher competency ($r = 0.649$, $p < 0.001$). The findings suggest that continuous exposure to technological challenges contributes to the development of more competent and adaptive teachers.

This study contributes to the growing body of knowledge on digital learning in vocational special education and provides empirical evidence that strengthening digital infrastructure, institutional support, and continuous professional development can further enhance teachers' competency in implementing effective digital learning environments for students with special educational needs.

Keywords: Teacher Competency, Digital Learning, Vocational Special Education, Special Educational Needs, Challenges

INTRODUCTION

The emergence of the Fourth Industrial Revolution (IR 4.0) has accelerated the integration of digital technologies into educational practices worldwide. Digital learning has become an essential component of contemporary education because it enables educators to create flexible, interactive, and learner-centred instructional environments that support meaningful learning experiences (Bond et al., 2021). The adoption of digital technologies has expanded considerably following the COVID-19 pandemic, highlighting the importance of

teachers' ability to effectively utilise digital tools and platforms in teaching and learning activities (Dhawan, 2020).

Within the context of vocational special education, digital learning plays a particularly important role in supporting students with special educational needs (SEN). These students often require differentiated instructional strategies, personalised learning pathways, and adaptive educational resources to accommodate their diverse cognitive, behavioural, and physical characteristics. Digital technologies offer opportunities to enhance accessibility, engagement, and learning outcomes through multimedia content, assistive technologies, interactive applications, and virtual learning environments (Haleem et al., 2022).

Despite the potential benefits of digital learning, its implementation remains challenging. Previous studies have reported that teachers frequently encounter barriers related to technological infrastructure, limited digital skills, insufficient institutional support, and varying levels of readiness to integrate technology into classroom practices (König et al., 2020; Scherer et al., 2021). These challenges become more complex in special education settings, where teachers must adapt digital resources to meet individual student needs while maintaining effective instructional practices.

Teacher competency is recognised as one of the most critical factors influencing the successful integration of technology in education. According to Spencer and Spencer (1993), competency encompasses knowledge, skills, and attitudes that contribute to superior performance in professional settings. Teachers who possess strong digital competencies are more likely to adopt innovative teaching practices, respond effectively to technological changes, and facilitate meaningful learning experiences for students.

Although numerous studies have investigated technology integration and teacher competency, limited research has specifically focused on vocational special education teachers in Malaysia. Furthermore, empirical evidence examining the relationship between digital learning challenges and teacher competency remains scarce. Therefore, this study seeks to fill this gap by investigating the competency level of vocational special education teachers, identifying the challenges they face in implementing digital learning, and examining the relationship between these variables.

Research Objectives

1. To determine the level of competency among vocational special education teachers in implementing digital learning.
2. To identify the challenges faced by vocational special education teachers in implementing digital learning.
3. To examine the relationship between digital learning challenges and the competency of vocational special education teachers.

LITERATURE REVIEW

Teacher Competency in Digital Learning

Teacher competency refers to the combination of knowledge, skills, attitudes, and personal attributes required to perform teaching responsibilities effectively. Spencer and Spencer (1993) proposed that competency serves as a fundamental characteristic that influences individual performance and professional effectiveness. In digital learning environments, competency extends beyond pedagogical knowledge to include technological literacy and the ability to integrate digital tools into teaching practices.

Teacher competency in this study is conceptualised through three dimensions: knowledge, skills, and attitudes. Knowledge refers to teachers' understanding of digital technologies and their educational applications. Skills involve the ability to operate digital tools, create digital learning materials, and manage online learning

environments. Attitudes represent teachers' willingness, confidence, and openness towards adopting technology in educational settings.

Research has consistently demonstrated that teachers with higher levels of digital competency are more successful in integrating technology into teaching and learning processes (Tondeur et al., 2021). Similarly, Ng et al. (2023) reported that digital competencies are increasingly essential for educators to meet the demands of twenty-first-century education.

Challenges in Implementing Digital Learning

The implementation of digital learning involves numerous challenges that may influence teachers' ability to effectively utilise technology. These challenges include technological barriers, inadequate infrastructure, insufficient training, and limited organisational support (Al-Fraihat et al., 2020).

This study adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh et al. (2003). The model identifies four key determinants influencing technology adoption:

- Performance Expectancy
- Effort Expectancy
- Social Influence
- Facilitating Conditions

These constructs provide a comprehensive framework for understanding teachers' experiences and challenges when implementing digital learning.

Relationship Between Challenges and Teacher Competency

While challenges are often perceived as barriers, they may also contribute to professional growth and competency development. Teachers who continuously engage with technological challenges often develop stronger digital skills and adaptive teaching strategies (Trust & Whalen, 2020).

Tondeur et al. (2021) found that teachers who actively overcome technological obstacles demonstrate greater confidence and competency in technology integration. Therefore, examining the relationship between digital learning challenges and teacher competency is important for understanding how challenges influence professional development in vocational special education contexts.

METHODOLOGY

This study employed a quantitative descriptive survey design. The population consisted of vocational special education teachers from vocational special education schools in Johor, Malaysia. A total of 96 teachers participated in the study through simple random sampling.

Data were collected using a structured questionnaire consisting of three sections:

Section A: Demographic Information

- Gender
- Age
- Academic qualification
- Teaching experience

- Vocational programme taught
- SEN categories taught
- Digital learning training experience

Section B: Teacher Competency

- Knowledge
- Skills
- Attitudes

Section C: Digital Learning Challenges

- Performance Expectancy
- Effort Expectancy
- Social Influence
- Facilitating Conditions

A five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used.

Data were analysed using SPSS Version 29. Descriptive statistics, including mean and standard deviation, were used to determine competency and challenge levels. Pearson correlation analysis was conducted to examine the relationship between digital learning challenges and teacher competency.

Table 1. Five-Point Likert Scale

Response Category	Abbreviation	Score
Strongly Disagree	SD	1
Disagree	D	2
Somewhat Agree	SWA	3
Agree	A	4
Strongly Agree	SA	5

Table 2. Interpretation of Mean Score Levels

Mean Score Range	Interpretation
1.00 – 1.80	Very Low
1.81 – 2.60	Low
2.61 – 3.40	Moderate
3.41 – 4.20	High

4.21 – 5.00	Very High
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The collected data were analysed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistical analysis was employed to determine the levels of teacher competency and digital learning challenges through the calculation of mean scores and standard deviations. Subsequently, Pearson correlation analysis was conducted to examine the relationship between digital learning challenges and teacher competency.

Pearson correlation was considered appropriate because the study data were measured on an interval scale and satisfied the assumption of normality. Furthermore, a sample size exceeding 30 respondents supports the use of parametric statistical techniques and enhances the accuracy of the analysis. The correlation coefficient values were interpreted to determine the strength and direction of the relationship between the variables under investigation.

FINDINGS AND DISCUSSION

The findings indicate that vocational special education teachers demonstrated a very high level of competency in implementing digital learning. Overall, the three competency constructs, namely knowledge, skills, and attitudes, recorded very high mean scores. This suggests that teachers are well-prepared to integrate digital technology into teaching and learning activities.

Table 3. Competency Level of Vocational Special Education Teachers in Implementing Digital Learning

Construct	Mean	SD	Level
Knowledge	4.38	0.56	Very High
Skills	4.23	0.63	Very High
Attitude	4.39	0.59	Very High
Overall	4.33	0.59	Very High

Based on Table 3, the overall competency level of vocational special education teachers in implementing digital learning was very high ($M = 4.33$, $SD = 0.59$). Among the three constructs, attitude recorded the highest mean score ($M = 4.39$, $SD = 0.59$), followed by knowledge ($M = 4.38$, $SD = 0.56$) and skills ($M = 4.23$, $SD = 0.63$). These findings suggest that teachers have positive attitudes towards technology and are willing to adopt digital learning in their teaching practices. However, efforts to strengthen teachers' technical skills remain important to ensure more effective use of digital technologies.

Table 4. Challenges Faced by Vocational Special Education Teachers in Implementing Digital Learning

Construct	Mean	SD	Level
Performance Expectancy	4.49	0.60	Very High
Effort Expectancy	4.34	0.64	Very High
Social Influence	4.51	0.62	Very High
Facilitating Conditions	4.10	0.78	High
Overall	4.36	0.66	Very High

Based on Table 4, the overall level of challenges experienced by teachers was very high ($M = 4.36$, $SD = 0.66$). The highest mean score was recorded for social influence ($M = 4.51$, $SD = 0.62$), followed by performance

expectancy ($M = 4.49$, $SD = 0.60$) and effort expectancy ($M = 4.34$, $SD = 0.64$). Facilitating conditions recorded the lowest mean score ($M = 4.10$, $SD = 0.78$), although it remained at a high level. These findings indicate that teachers continue to face various challenges when implementing digital learning despite their high competency levels.

Table 5. Summary of Correlation and Regression Analysis

Analysis	Variables	Value	Sig. (p)	Interpretation
Overall Correlation	Challenges – Competency	$r = 0.649$	< 0.001	Strong
Construct Correlation	Performance Expectancy – Attitude	$r = 0.714$	< 0.001	Strong
	Effort Expectancy – Skills	$r = 0.499$	< 0.001	Moderate
	Social Influence – Attitude	$r = 0.581$	< 0.001	Moderate
	Facilitating Conditions – Knowledge	$r = 0.246$	0.016	Weak
Regression Model	R	0.691	–	Strong
	R^2	0.478	–	47.8% Variance Explained
	F	20.842	< 0.001	Significant
Regression Coefficients	Performance Expectancy	$\beta = 0.417$	< 0.001	Significant
	Effort Expectancy	$\beta = 0.158$	0.430	Not Significant
	Social Influence	$\beta = 0.244$	0.507	Not Significant
	Facilitating Conditions	$\beta = -0.025$	0.792	Not Significant

Based on Table 5, Pearson correlation analysis revealed a significant positive relationship between digital learning challenges and teacher competency ($r = 0.649$, $p < 0.001$). The strength of the relationship was classified as strong. This finding indicates that teachers who face more challenges in digital learning tend to develop higher levels of competency.

At the construct level, the strongest relationship was found between performance expectancy and attitude ($r = 0.714$, $p < 0.001$), followed by social influence and attitude ($r = 0.581$, $p < 0.001$). The relationship between effort expectancy and skills was moderate ($r = 0.499$, $p < 0.001$), while the relationship between facilitating conditions and knowledge was weak but still significant ($r = 0.246$, $p = 0.016$). Overall, all challenge constructs showed significant relationships with teacher competency, although the strength of the relationships varied.

Furthermore, multiple regression analysis showed that the model was statistically significant ($F = 20.842$, $p < 0.001$), with an R value of 0.691 indicating a strong relationship between the variables. The R^2 value of 0.478 suggests that 47.8% of the variance in teacher competency can be explained by the challenge constructs included in the model, while the remaining variance is influenced by other factors.

Among the four challenge constructs, only performance expectancy significantly predicted teacher competency ($\beta = 0.417$, $p < 0.001$). In contrast, effort expectancy ($\beta = 0.158$, $p = 0.430$), social influence ($\beta = 0.244$, $p = 0.507$), and facilitating conditions ($\beta = -0.025$, $p = 0.792$) did not significantly influence teacher competency. These findings indicate that although all challenge constructs are related to teacher competency, performance

expectancy is the most important predictor of competency among vocational special education teachers in implementing digital learning.

CONCLUSION

This study investigated the competency level of vocational special education teachers, the challenges encountered in implementing digital learning, and the relationship between these variables. The findings revealed that teachers demonstrated very high levels of competency in terms of knowledge, skills, and attitudes. At the same time, teachers also experienced substantial challenges related to performance expectancy, effort expectancy, social influence, and facilitating conditions.

More importantly, a significant positive relationship was found between digital learning challenges and teacher competency. This finding suggests that continuous engagement with technological challenges contributes to the development of more competent and adaptive educators. Therefore, educational institutions should continue strengthening digital infrastructure, providing ongoing professional development opportunities, and establishing supportive organisational environments to enhance the effectiveness of digital learning implementation in vocational special education.

This study contributes to the growing body of knowledge on digital learning and vocational special education by providing empirical evidence regarding the relationship between challenges and teacher competency, which may inform future policy development and educational practice.

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Conflict Of Interest

The authors declare no conflict of interest regarding the publication of this manuscript.

Author Contributions

Both authors contributed substantially to the conception and design of the study, data collection, data analysis, interpretation of findings, and manuscript preparation.

REFERENCES

1. Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating e-learning systems success: An empirical study. *Computers in Human Behavior*, 102, 67–86.
2. Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2021). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *Educational Technology Research and Development*, 69(2), 653–685.
3. Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.
4. Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49(1), 5–22.
5. Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). SAGE Publications.
6. Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
7. König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany.

European Journal of Teacher Education, 43(4), 608–622.
<https://doi.org/10.1080/02619768.2020.1809650>

8. Montenegro-Rueda, M., & Fernández-Batanero, J. M. (2024). Adaptation and validation of an instrument for assessing the digital competence of special education teachers. *European Journal of Special Needs Education*, 39(3), 367–382.
9. Ng, D. T. K., Leung, J. K. L., Su, J., Ng, R., & Chu, S. K. W. (2023). Teachers' AI digital competencies and twenty-first-century skills in the post-pandemic world. *Educational Technology Research and Development*, 71(1), 137–161.
10. Rakes, G. C., & Casey, H. (2023). Competencies of special education teachers in using digital learning tools. *Journal of Special Education Technology*, 38(1), 45–59.
<https://doi.org/10.1177/01626434221110374>
11. Ramakrishnan, R., Mohamad Salleh, N., & Aliza, A. (2022). The relationship between teaching style, self-efficacy and competency in vocational special education teachers. *Akademika*, 92(Special Issue 1), 81–94. <https://doi.org/10.17576/akad-2022-92IK1-07>
12. Reinholz, D. L., Stone-Johnstone, A., White, I., Sianez, L. M., & Shah, N. (2020). A pandemic crash course: Learning to teach equitably in synchronous online classes. *CBE—Life Sciences Education*, 19(4), 1–13. <https://doi.org/10.1187/cbe.20-06-0127>
13. Roslin, N. B., & Salleh, N. M. (2021). Penggunaan M-learning sebagai bahan bantu pengajaran dalam kelas pendidikan khas. *Malaysian Journal of Social Sciences and Humanities*, 6(5), 53–63.
<https://doi.org/10.47405/mjssh.v6i5.760>
14. Scherer, R., Siddiq, F., & Tondeur, J. (2021). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education*, 128, 13–35. <https://doi.org/10.1016/j.compedu.2018.09.009>
15. Spencer, L. M., & Spencer, S. M. (1993). *Competence at work: Models for superior performance*. John Wiley & Sons.
16. Tondeur, J., Scherer, R., Siddiq, F., & Baran, E. (2021). A comprehensive analysis of teacher digital competence. *Computers & Education*, 162, Article 104080.
17. Trust, T., & Whalen, J. (2020). Should teachers be trained in digital learning? Lessons learned from the COVID-19 pandemic. *Journal of Technology and Teacher Education*, 28(2), 189–199.
18. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
19. Yusof, N., Ismail, H., & Rahman, S. (2022). Integrasi teknologi digital dalam pendidikan khas: Cabaran dan penyelesaian. *Jurnal Pendidikan Malaysia*, 47(2), 50–60.