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Investigate the Role of Resonant Leadership on the Quality of Virtual school Education Mediated by Teachers' Innovative Work Behavior

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Abstract:

The aim of the research was to investigate the role of resonant leadership on the quality of virtual school education mediated by the innovative work behavior of teachers. The study population consisted of all secondary school teachers in Hamedan province during the academic year 2021-2022 (N=1797). A sample of 316 teachers was chosen through proportional stratified random sampling, following Cochran's formula. This descriptive correlational research employed the structural equation modeling (SEM) approach. Data collection utilized Wagner's Resonant Leadership Questionnaire (2010), Janssen's Innovative Work Behavior Scale (2000), and a researcher-developed questionnaire on the quality of virtual education in schools. A significant finding of the study indicates that the indirect effect of resonant leadership on the quality of virtual education, mediated by innovative work behavior, surpasses its direct effect. Therefore, school leaders are advised to capitalize on teachers' innovative behaviors to enhance the quality of virtual education and cultivate an environment that values teachers' ideas and creativity more than strict adherence to rules and regulations.

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Introduction:

The advent of information technology has brought about the phenomenon of educational technology in educational institutions. This phenomenon has revolutionized education from its conventional form and has imparted a unique direction to it (Verkuyl & Hughes, 2019). With the increasing prevalence of virtual space, educational technologies have introduced virtual education as a competitive edge in the field of education, which inherently requires a satisfactory standard (Fernandez et al., 2020). Various terms like computer-based education, CD-based education, online education, web-based education, and Internet-based education have been used interchangeably to denote education delivered to learners through computers, multimedia, and Internet platforms (Zouaq et al., 2007). Broadly speaking, virtual education encompasses any form of course or training conducted in addition to traditional face-to-face methods (Sunbria et al., 2018). Virtual education and online learning have been acknowledged as effective means to enhance the quality of education. Online learning enables students to learn swiftly and conveniently at their own pace (Syauqi et al., 2020). Virtual education and online learning offer several benefits, including flexibility (Smedley, 2010), interaction (Leszczyński et al., 2018; Wenger et al., 2008), self-regulation, and the ability to capitalize on current opportunities (Al-Rahmi et al., 2020). Moreover, they provide access to content, such as the capability to record audio and video for future use, and are cost-effective (Oliveira et al., 2018). They foster continuous engagement opportunities for participants in an educational setting (Jennifer, 2020), thereby enhancing the quality of the teaching and learning process. Quality in education encompasses all functions and activities, including training, research, staff, students, facilities, equipment, and services to society and schools. In essence, according to the organizational elements model, to enhance the quality of the educational system, all components such as inputs, processes, products, outputs, and consequences must be considered (Khedemi & Solimani, 2020).

The examination of evidence, documentation, and research findings reveals the presence of challenges and issues within the virtual education system, as well as concerns regarding its quality of delivery and acceptance by students (Lee, 2020; Saeedi et al., 2021; Shahri et al., 2021; Ghorbankhni & Salehi, 2016). Studies indicate that while digital technology and virtual education emerged as a solution for teachers to address the disruptions caused by the closure of educational institutions (Leonard & Rosienne, 2020), there was a lack of enthusiasm and trust among participants regarding their efficacy and outcomes (Zug & Loud, 2024). Firstly, individuals may struggle to adapt to this form of education on an emotional level (Saeedi et al., 2022). Consequently, the rise of virtual education has led to a decrease in the significance and monitoring of its outcomes by students (Kaki & Sadr, 2023). In this context, educational institutions have sought leaders who, as the driving force of any organization (Spector, 2019), can transform a discouraging situation into a hopeful one. These leaders have the ability to shift negative perceptions of virtual education towards positive ones and support teachers in implementing innovative approaches to engage students. Resonant leadership, based on the theory of emotional contagion (Goleman et al., 2002), can reinforce this feeling by spreading positive emotions. Resonant leadership theory suggests that the positive emotions elicited by resonant leaders are contagious and have a resonating effect on individuals (Kranthi, Rai & Showry, 2024). Leaders who can inspire optimal performance through positive emotions are recognized as resonant leaders (Lenka & Tiwari, 2016). Resonant leadership presents a promising approach for enhancing teachers' professional development in a sustainable manner. The primary objective of resonant leadership in educational settings is to work towards the progress and success of all students. This entails assessing and addressing marginalizing structures and policies, while also embracing an inclusive leadership approach (Daly et al., 2014) that considers diverse perspectives and voices.

On the contrary, teachers, serving as facilitators and mentors in educational processes, hold a pivotal role in enhancing the quality of education and promptly addressing uncertainties. The rise of environmental issues and the educational system's responsiveness to the environment emphasis the importance of timely and appropriate responses to these changes. Failure to address these changes promptly and accurately may lead to numerous challenges for schools and the educational system. Addressing these changes in a timely manner necessitates educational leaders and teachers to innovate (Haji Aliakbari & Nazari Farokhi, 2019). The innovation and creative responses of teachers to emerging challenges are crucial, impactful, and successful in supporting the quality of educational processes within the system (Widodo & Gunawan, 2021). Innovative work behavior encompasses all actions undertaken by an individual to generate, process, and implement novel and innovative ideas concerning work methodologies and procedures, including the adoption of new technologies to enhance organizational success and efficiency (Kim et al., 2021). Innovation yields numerous advantages for organizations and arises from creativity (Nikkhah Farkhani & Daneshvari, 2020). Within the realm of education, innovation denotes deliberate and purposeful efforts to introduce modifications to the educational system with the objective of enhancing the existing framework. Innovations are commonly associated with alterations in administration, curricula, textbooks, teaching methods, and their practical application (Torani et al., 2016). Several studies exploring innovative work behavior and its correlations with other variables, such as Widodo & Gunawan (2021), Wang et al. (2021), Al-Shammari (2019), Gil et al. (2018), Torani et al. (2016), and Ahmadi et al. (2017). They have demonstrated that innovative work behavior is a significant factor influencing organizational effectiveness.

Emerging challenges and environmental uncertainty have increased pressure on educational organizations to effectively manage complex conditions, improve the competencies of educational leaders as well as teachers, and elevate the quality of their services and outcomes. Consequently, proficient leadership and continual enhancement of educational process quality in the face of challenges stand out as paramount responsibilities for every institution. Unforeseen expenses and shifts in public trust have prompted policymakers and the community to pose critical inquiries regarding the efficacy of educational systems (Shirbigi et al., 2016). Within educational systems, quality holds a distinct significance, aiming for the optimal utilization of resources and facilities (Nouri Hassan Abadi, 2020). Given its significance, enhancing the quality and efficacy of virtual education as a means to elevate teaching standards has emerged as a crucial concern for enhancing school performance, as well as for boosting the efficiency and effectiveness of education and advancing the nation's progress. Therefore, an academic explanation and the investigation of effective variables have become necessary. According to the theoretical foundations of the research, it appears that implementing effective leadership in schools and fostering an environment that encourages innovative work behavior in teachers will result in improved school performance and ultimately contribute to the delivery of high-quality virtual education. Therefore, this current study aims to answer the question: Does resonant leadership influence the quality of virtual education through the innovative work behavior of secondary school teachers in Hamedan province?

Conceptual model of research

According to theoretical foundations, the research's conceptual model can be structured around three variables and four hypotheses. These variables include resonant leadership of school principals as an independent variable, innovative work behavior as a mediating variable, and the quality of virtual education as a dependent variable. A conceptual framework can be developed based on these variables and hypotheses, aligning with research in organizational studies.

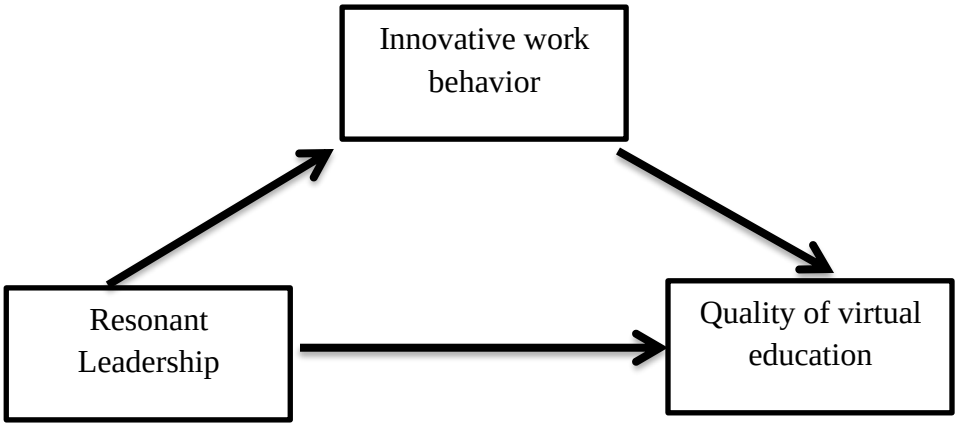

Figure 1: Conceptual model of the research

Research Hypotheses

1. Resonant leadership has a significant effect on the quality of virtual education.
2. Resonant leadership has a significant effect on innovative work behavior.
3. Innovative work behavior has a significant effect on the quality of virtual education.
4. Resonant leadership has a significant effect on the quality of virtual education, with the mediating role of innovative work behavior.

Research methodology

The study employed a descriptive and correlational research methodology. The research population consists of all secondary school teachers in Hamedan province during the academic year 2021-2022 (N=1797). Of those, 895 are women and 902 are men. The sample size was determined using Cochran's formula ($\alpha = 0.05$; Error value = 0.05, P & O ratio = 0.5), resulting in a sample of 316 teachers. Proportional stratified random sampling was utilized based on the characteristics of the research population, including educational area and gender. The data collection instruments used in this study were the following questionnaires:

Wagner's (2010) resonant leadership questionnaire was employed to evaluate resonant leadership. The scale comprises ten items rated on a five-point Likert scale. The reliability of the questionnaire was assessed using Cronbach's alpha method, yielding a coefficient of 0.83. To evaluate the validity of the questionnaire, first-order confirmatory factor analysis (CFA) was performed. The results of the CFA indicated a good fit for the questionnaire, with the following fit indices: chi-square=62.65, df=35, chi-square/df=1.79, RMSEA=0.050, CFI=0.96, GFI=0.96, and AGFI=0.94. The factor loading values of the items ranged from 0.51 to 0.68, demonstrating the significance of the first-order factor loadings (t-value is greater than |1.96|).

Janssen's (2000) questionnaire was utilized to assess innovative work behavior in three dimensions including idea generation (items 1 to 3), idea promotion (items 4 to 6), and idea implementation (items 7 to 9) (Janssen, 2000). Cronbach's alpha method was utilized to assess the reliability of the questionnaire. The overall alpha value of the questionnaire was 0.94, indicating the questionnaire's adequate reliability (idea generation = 0.86, idea promotion = 0.87, and idea implementation = 0.90). Second-order confirmatory factor analysis (CFA) was employed to assess the validity of the questionnaire. According to the results of the second-order confirmatory factor analysis, the fit indices of the questionnaire indicate a good fit (chi-square=86.47, df=24, chi-square/df=1.99, RMSEA=0.056, CFI=0.97, GFI=0.96, and AGFI=0.94). The factor loading values of the items ranged from 0.58 to 0.80, indicating the significance of the first-order factor loadings (t-value is greater than |1.96|).

To evaluate the quality of virtual education, a researcher-designed questionnaire comprising 52 items and 5 dimensions was employed. These dimensions encompassed educational design quality (Items 1 to 8), qualifications and competencies quality (Items 9 to 16), support quality (Items 17 to 32),

teaching quality (Items 33 to 44), and evaluation quality (Items 45 to 52), all assessed on a five-point Likert scale. The reliability of the research instrument was assessed using Cronbach's alpha method. The alpha values for the questionnaire and its dimensions were as follows: virtual education quality (0.92), educational design quality (0.85), qualifications and competencies quality (0.88), support quality (0.90), and teaching quality (0.91). The questionnaire's reliability was confirmed by high internal consistency (0.88) and evaluation quality (0.88), indicating its appropriateness. To establish the tool's validity, content validity ratio, exploratory factor analysis, and confirmatory factor analysis methods were employed. As the virtual education quality questionnaire was developed by the researcher, the content validity ratio of the questionnaire was initially assessed. Subsequently, exploratory factor analysis with varimax rotation was conducted, followed by second-order confirmatory factor analysis. The content validity ratio for the items ranged from 0.6 to 1.00, with values for the educational design dimension at 0.85, qualifications and competencies dimension at 0.925, support dimension at 0.90, teaching dimension at 0.883, and evaluation dimension at 0.975. The overall content validity ratio for all items was 0.906, meeting the minimum acceptable value of the Content Validity Ratio (CVR) for ten experts, which is 0.62, thus confirming the questionnaire's content validity regarding virtual education quality. In the exploratory factor analysis, the Kaiser-Meyer-Olkin (KMO) value was 0.96, and Bartlett's test of sphericity value was 13402.231 ($df = 1326$; $p < 0.01$). The analysis revealed five factors with eigenvalues exceeding 1, explaining 65% of the variance in virtual education quality. The results of the second-order confirmatory factor analysis indicated that the explained variance of virtual education quality was 0.59, significant at the 0.01 level based on the t value (8.72). The fit indices of the virtual education quality questionnaire suggested that the researcher-developed questionnaire exhibited a suitable and acceptable fit (chi-square = 2405.62, df = 1269, chi-square/df = 1.89, RMSEA = 0.053, CFI = 0.98, GFI = 0.95, and AGFI = 0.92). The factor loading values of the items in the first-order ranged from 0.68 to 0.85, indicating the significance of the first order factor loadings (t-value is greater than |1.96|). The factor loading values of the dimensions in the second-order questionnaire ranged from 0.57 to 0.88, indicating the significance of the second-order factor loadings (t-value is greater than |1.96|). The data was analyzed using statistical techniques including frequency distribution, mean, standard deviation, Pearson correlation matrix, and path analysis with Lisrel 10.30 software.

Findings

Sample description: According to the descriptive analysis of the data, 20 of the sample members (6.3%) have an associate degree, 234 people (74.1%) have a bachelor's degree, and 62 people (19.6%) have a master's or doctoral degree. Additionally, 72 members of the sample (22.8%) are less than 30 years old, 79 (25%) are aged 30 to 40 years, 123 people (38.9%) are between 40 and 50 years old, and 42 people (13.3%) are over 50 years old. Out of the sample, 89 members (28%) have less than 10 years of experience, 88 people (27%) have 10 to 20 years of experience, and 139 people (44%) have more than 20 years of experience. Kline (2011) suggests that when conducting structural modeling, it is important to check the normal distribution of variables. According to Kline, the absolute value of skewness should not exceed 3, and the kurtosis of variables should not exceed 10. According to Table 1, the absolute values of skewness and kurtosis for all variables are less than those suggested by Klein (2011). Therefore, the assumption of normality of the data for structural modeling is confirmed.

Table 1: Descriptive indices of research variables

variables	Mean	SD	Skewness	Kurtosis
Resonant Leadership	3.21	.71	-0.11	-0.02
Innovative work behavior	3.25	.57	-0.09	-0.19
Quality of virtual education	3.89	.75	-0.19	-0.30

Another assumption of structural modeling is the importance of the correlation matrix. The correlation matrix for the research variables is presented in Table 2.

Table 2: Correlation matrix of research variables

N	variables	1	2	3
1	Resonant Leadership	1		
2	Innovative work behavior	0.67*	1	
3	Quality of virtual education	0.61**	0.72	1

*p<0.05, **p<0.01

The research hypotheses were analyzed using the path analysis method. The results of the analysis are presented below.

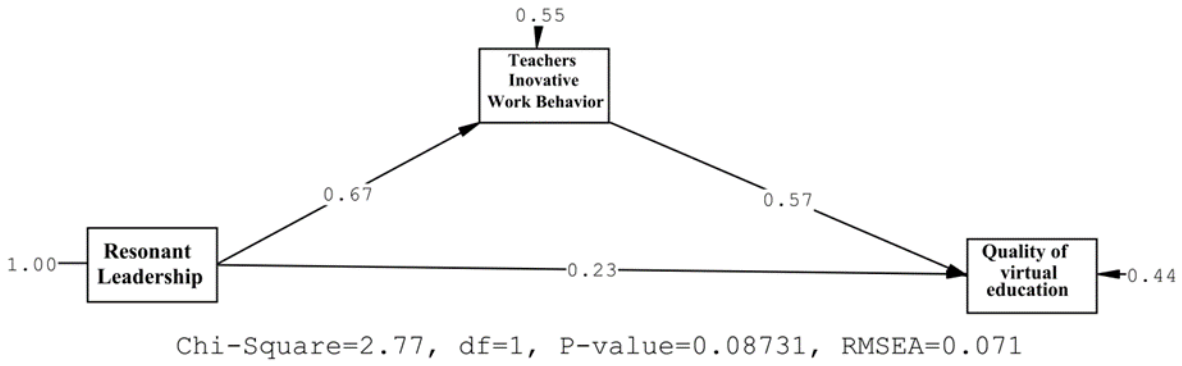

Figure 2- Tested research model in standard mode

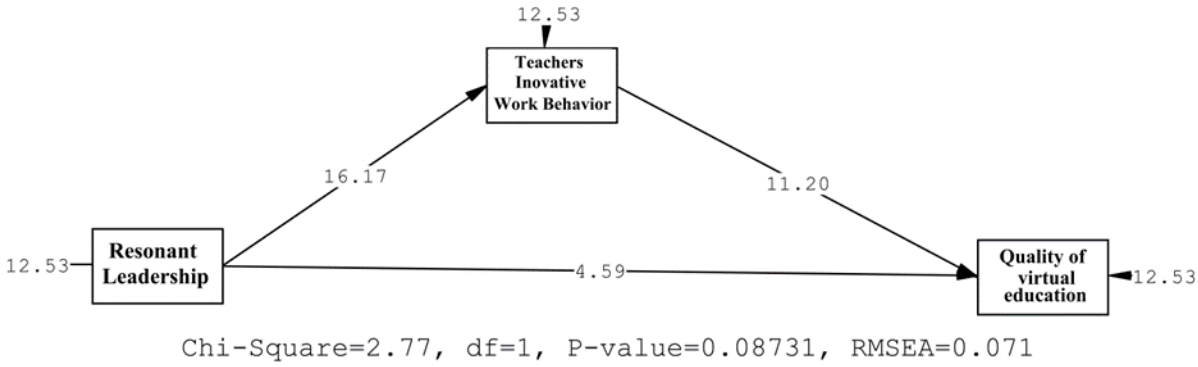

Figure 3- Tested model of the research in meaningful mode

According to Figure 2, the effect of resonant leadership (0.23) on the quality of virtual education is positive and statistically significant (t value=4.59; p<0.01). The effect of resonant leadership (0.67) on innovative work behaviors is positive and statistically significant (t value=16.17; p<0.01). The impact of innovative work behaviors (0.57) on the quality of virtual education is positively and significantly significant (t value=11.20; p<0.01). The effect of resonant leadership on the quality of virtual education is both positive and significant, with innovative work behaviors playing a mediating role (0.38) (t value=9.89; p<0.01). In Table 3, the fit indices were presented.

Table 3: goodness of fit indices of the tested research model

AGFI	GFI	CFI	RMSEA	X^2/df
0.82	0.91	0.93	0.07	2.77

To assess the fit of the tested model, we utilized the indicators introduced by Klein (2011). These indexes include X2/df (less than 3), GFI and CFI (greater than 0.9), AGFI (greater than 0.8), and RMSEA (less than 0.08).

Table 4: The results of research hypotheses

Hypotheses	Path coefficient	t	p	Result
RL* has a significant effect on the quality of virtual education.	0.23	4.59	100/0	Improved
RL has a significant effect on innovative work behavior.	0.67	16.17		
Innovative work behavior has a significant effect on the quality of virtual education.	0.57	11.20		
RL has a significant effect on the quality of virtual education with the mediating role of innovative work behavior.	0.38	9.89		

*Resonant Leadership

Conclusion

The study findings suggest that the resonant leadership exhibited by school principals correlates positively and significantly with the quality of virtual education in schools. This study's outcomes align with previous research by Makhamreh & Abedrabou (2023), Radhwan (2020), Bron & McAuliffe (2020), Torliyantabar & Hossini (2018), Bawafa et al. (2015), and Benjamin & Flynn (2006), which have shown that leadership styles have a positive and significant relationship with the quality of teaching and learning. Effective implementation of resonant leadership by school principals can mitigate educational challenges encountered during the COVID-19 pandemic, particularly in addressing infrastructural and technical issues, challenges within the teaching-learning process, and cultural-social obstacles. This, in turn, contributes to the continuous enhancement of virtual education quality as a viable educational solution during the pandemic. Despite initial challenges faced by virtual education, its numerous advantages can provide high-quality education during the pandemic (Cajahuanca-Loli et al., 2023). Resonant leadership by school principals plays a crucial role in enhancing the quality and alignment of educational practices. The leadership style adopted by school principals significantly influences their effectiveness and efficiency, impacting various educational components, including teachers. Resonant leaders promote employee engagement in decision-making and problem-solving processes (Makhamreh & Abedrabou, 2023), fostering a collaborative environment that enhances group dynamics and facilitates effective communication. This positive and motivating atmosphere encourages individuals to strive towards achieving common goals (Andra et al., 2019). Drawing on the emotional contagion theory (Golman et al., 2019), resonant leadership cultivates hope and positivity within an organization, inspiring success and emphasizing capabilities. Leaders who attend to emotions can enhance individuals' performance, as emotions play a pivotal role in motivating individuals and fostering satisfaction in the workplace. Resonant leadership involves acknowledging and validating teachers' emotions and opinions, creating a safe and valued environment that enhances teacher motivation and commitment to teaching. Therefore, the consideration of emotions by a leader is a beneficial factor that enhances individuals' performance (Goleman et al., 2002).

According to Abdurrahman (2022), appropriate leadership styles help individuals to make the right choices in achieving their tasks and to feel more motivated and satisfied in the work environment. Resonant leadership involves listening to teachers' feelings and taking the time to acknowledge and validate their emotions and opinions. In such an environment, teachers feel safe, valued, and purposeful. It is natural for such feelings to make them more motivated to teach. Therefore, by fostering a positive atmosphere within the organization and establishing emotional connections with teachers, resonant leaders stimulate increased motivation and effort, ultimately improving the quality of teaching and ensuring effective evaluation. They enhance teachers' competencies, foster mutual relationships with students, and promote educational competencies that are fundamental principles of professional teaching ethics. Therefore, the use of resonant leadership motivates teachers to exert all their efforts to achieve the predetermined educational goals. As a result, the quality of virtual education improves. On the other hand, resonant leadership empowers employees, leading to increased satisfaction, a sense of belonging, and commitment (Boyatzis & McKay, 2005). Empowering employees has been shown to increase their satisfaction, sense of belonging, and commitment. It also plays a crucial role in helping individuals achieve educational objectives, nurturing a sense of ownership among employees in their respective roles (Rezaee, 2016), and contributing to the professional growth of teachers (Moharamzadeh & Naghavi, 2014). This, in turn, sets the stage for enhancing the quality of virtual education. The findings suggest that the educational system of the country should focus on developing leaders capable of improving the quality of virtual education through resonant leadership in educational institutions, fostering a positive and motivating environment.

The outcomes of this study also suggest that the resonant leadership exhibited by school principals has an effect on the innovative work behavior of secondary school teachers in Hamedan province. This finding is consistent with Rajab Dari et al. (2021), Nazir et al. (2020), Shah et al. (2020), and Heinrichs (2009). The researchers concluded that there is a positive and significant relationship between leadership, leaders' competencies, and the encouragement of creativity and innovation. According to Carmeli & Russo (2016), positive relationships between leaders and their subordinates can mitigate workplace stress, offer social support, and nurture transparent relationships, ultimately leading to increased innovative behavior among employees. Employees who experience varying degrees of support from their leaders are more likely to engage in innovation by either introducing new tasks or enhancing existing processes (Martins & Terblanche, 2003). Consequently, it can be concluded that cultivating a positive environment enables leaders to assist teachers by highlighting their strengths rather than focusing on mistakes. They reduce stress and the fear of failure, empowering teachers to refine their concepts and ultimately laying the basis for the emergence of innovative behavior in their professional endeavors.

The research findings indicate that the innovative work behavior of teachers significantly impacts the quality of virtual education in secondary schools in Hamedan province. This finding is consistent with Widodo & Gunawan (2021), Khosravi et al. (2020), Ghanbari et al. (2014), and Batastini (2012). They showed that creativity and innovation are effective factors in enhancing the quality of teaching and learning. Organizations that promote employee engagement in innovative practices and establish a work environment characterized by high psychological safety are likely to experience improved performance outcomes (Khosravi et al., 2020). Teachers' innovative strategies in teaching methodologies, classroom management, and time allocation contribute to creating a dynamic, interactive, and active learning atmosphere that enhances the performance of both teachers and students. This issue facilitates the path to achieving educational objectives for teachers and students alike. Ultimately, teachers' innovative behaviors play a pivotal role in elevating the standard of virtual education.

Another finding of this study indicates that the resonant leadership exhibited by school principals indirectly enhances the quality of virtual school education through the innovative work behavior of

teachers. This finding is consistent with Alheet et al. (2021), Rajab Dari et al. (2021) and Nazir et al. (2020), The researchers concluded that different leadership styles have a positive and significant correlation with creativity and innovation. Furthermore, the outcomes of this study are consistent with Khosravi et al. (2020), Ghanbari et al. (2014), and Batastini (2012), which also indicated that innovation and creativity are closely associated with school effectiveness. Shanker et al. (2017) define innovative work behavior as the process of generating valuable ideas and implementing them to enhance existing services or products, or to create new ones. Visionary leaders empower their subordinates to perform exceptionally, surpassing expectations and improving their capacity to generate and advocate for new ideas and innovations (Ismail et al., 2010). Therefore, it can be inferred that the utilization of resonant leadership within educational institutions lays the groundwork for cultivating innovation among teachers. It can be concluded that the use of resonant leadership in educational settings serves as a foundation for nurturing innovation among teachers. Consequently, employing resonant leadership in educational institutions establishes an environment conducive to generating and endorsing innovative practices among teachers. Through their innovative actions and the creation and execution of valuable concepts, educators lay the basis for improving the quality of virtual education in schools. Resonant leaders foster an open environment that encourages the expression of ideas. Openness in idea-sharing and the belief in these ideas translate into innovation, ultimately enhancing the quality of teaching and learning processes. Consequently, resonant leaders enhance motivation by fostering a positive resonance within the organization and establishing emotional connections with teachers. This aspect is closely linked to endeavors aimed at enhancing teaching quality, conducting effective evaluations, developing teacher competencies, and fostering interactive relationships with students. Ultimately, the educational competencies of teachers, which are grounded in the tenets of professional teaching ethics, are reinforced.

The current study, similar to other research endeavors, is not without limitations. One of the constraints is the restricted statistical population, which solely comprises secondary school teachers in Hamadan province. This limitation could impede the generalization of the findings, their interpretations, and the documentation of variables. Therefore, it is advisable to replicate this study in various provinces and across diverse educational institutions. Additionally, this study employed a quantitative methodology, suggesting that future research could benefit from adopting a mixed methods approach.

The findings of this study suggest that selecting school principals who demonstrate resonant leadership qualities is advisable. Moreover, it is crucial to provide ongoing training sessions for school principals to familiarize them with the benefits of resonant leadership in educational settings and the characteristic behaviors of resonant leaders. By fostering hope and inspiration, emphasizing strengths and accomplishments over shortcomings, nurturing transparent relationships with teachers, and overall, by fostering a positive environment within the institution, school leaders can progress towards consistent leadership and enjoy its advantages. Within the organizational framework of educational institutions, particular emphasis should be placed on establishing evaluation and quality assurance centers for virtual education. Furthermore, a dedicated office with defined objectives, goals, and responsibilities should be instituted. To improve the quality of virtual education in schools, it is recommended to enhance the information and communication technology infrastructure, provide training on the utilization of new technologies, incorporate ethical considerations related to technology into teachers' responsibilities and educational materials, and enhance the speed and bandwidth of internet connectivity. In the annual evaluation of teachers, special points should be assigned to the optimal use of virtual space to advance educational goals. Encouraging innovative work behavior among teachers in educational institutions should be supported through financial resources for projects and by eliminating the fear of failure when experimenting with novel ideas. Educational institutions and school leaders should encourage increased collaboration by fostering communication and interaction among various groups,

teams, and innovative individuals. Evaluation and educational procedures in schools should be carried out electronically. The material delivered in virtual classrooms should align with the instructional objectives. The content should be structured from basic to advanced and from theoretical to practical concepts. It should be presented in multimedia formats (text, audio, animation, etc.) and tailored to the cultural and social norms of the students. To promote the innovative behavior of teachers, it is essential to welcome their proposals for addressing educational challenges and to endorse their fresh ideas.

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