



Teacher leadership and virtual communities: Unpacking teacher agency and distributed leadership

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Abstract

This study explored the development of teacher leadership in collaborative online spaces, also called virtual communities of practice (vCoP). Employing a phenomenological research design with semi-structured interviews as the primary data collection method, participants were drawn from a single vCoP. The findings underscored the pivotal role of vCoPs in nurturing teacher leadership skills, facilitated by the dynamic interplay of teacher agency and distributed leadership. Teacher agency empowers educators to proactively take control of their learning journey within vCoPs, enabling them to explore areas of personal interest and expertise, including knowledge sharing and project initiation. Simultaneously, distributed leadership empowers teachers to assume leadership roles within the vCoP, irrespective of their formal positions or seniority, involving activities such as guiding discussions and organizing professional development. This harmonious collaboration between teacher agency and distributed leadership fosters a collaborative and inclusive environment within vCoPs, where teacher leadership thrive.

Keywords Teacher leadership · Teacher agency · Distributed leadership · Virtual communities of practice

1 Introduction

A community of practice (CoP) for teachers is a group of individuals who share a common interest or passion, coming together to learn from one another and support each other's professional development (Admiraal et al., 2021). CoPs are typically

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conducted face-to-face and can take on formal or informal structures. Research suggests several benefits associated with teachers' participation in CoPs, including improved teaching practices (Admiraal et al., 2021), increased knowledge and skills (Prenger et al., 2019), enhanced feelings of support and connection to colleagues (Louis & Leithwood, 2021), reduced stress levels (Schaap et al., 2019), and the promotion of innovative teaching practices (Luyten & Bazo, 2019).

A virtual community of practice (vCoP) is a specific type of CoP that operates online and can be accessed from anywhere in the world, offering distinct advantages over face-to-face CoPs. While vCoPs have been present in the field of education for long time, serving as platforms for online collaboration among teachers (Ghamrawi, 2022), their popularity surged during the COVID-19 pandemic, becoming the primary means of remote teacher collaboration during that period (Bolisani et al., 2020; Delgado et al., 2021; Grunspan et al., 2021). Even post-pandemic, vCoPs continue to be widely endorsed as effective tools for teacher professional development and growth (Moser & Wei, 2023; Singh et al., 2022).

Teachers engaged in virtual communities of practice have been observed collaborating genuinely with peers, establishing shared values, supporting individuals through resource allocation and scaffolding, engaging in joint problem-solving, participating in debates, and facilitating collegial learning (Andrade et al., 2022; Bolisani et al., 2020; Delgado et al., 2021; Ghamrawi, 2022; Kalir, 2022; Yuan et al., 2022). These roles undertaken by teachers in vCoPs appear to align with the roles commonly associated with teacher leaders in the existing literature (Ghamrawi, 2010, 2011, 2013a, b; Harrison & Killion, 2007; Nguyen et al., 2020).

The literature has explored the relationship between teacher leadership and CoPs (Campbell et al., 2022; Murphy & Masterson, 2022; Oppi & Eisenschmidt, 2022; Wilson, 2016), and some studies have drawn connections between CoPs and agentive teachers (Caudle et al., 2014), as well as distributed forms of leadership (Zhang et al., 2022). However, there remains a significant gap in the literature regarding a comprehensive understanding of how teacher agency and distributed leadership contribute to the development of teacher leadership within such CoPs. This study aims to address this research gap by investigating the roles played by teacher agency and distributed leadership in the development of teacher leadership within the context of vCoPs. It is guided by the following research questions:

- (1) How does teacher agency contribute to teacher leadership development in virtual communities of practice?
- (2) How does distributed leadership contribute to teacher leadership development in virtual communities of practice?

2 Communities of practice and virtual communities of practice

Virtual communities of practice (vCoPs) are platforms for collaboration, resource-sharing, and mutual learning (Ghamrawi, 2022). These virtual communities extend the concept of traditional communities of practice (CoPs), originally developed by

Lave and Wenger (1991), emphasizing learning through shared interests and ongoing dialogue (Ghamrawi, 2022). vCoPs leverage technology to facilitate interaction irrespective of geographical boundaries.

Numerous studies have examined the advantages of vCoPs for educators. Hughes and Schwier (2012) highlighted their capacity to provide teachers with access to a broader range of resources, expertise, professional development opportunities, and social support. Likewise, Delgado et al. (2021) emphasized the role of vCoPs in promoting the sharing of best practices and boosting teachers' confidence in implementing new teaching strategies. Research has also explored into the factors contributing to vCoPs' success. Despite their potential benefits, challenges exist in implementing vCoPs. Strong leadership and administrative support are essential to sustain vCoPs over time (Chen & Hung, 2013; Ghamrawi, 2022). Additionally, technological barriers, including limited access to reliable internet connections and unfamiliarity with communication and collaboration software, can hinder participation (Hughes & Schwier, 2012).

The literature highlights the advantages of virtual communities of practice (vCoPs) over traditional communities of practice (CoPs) and vice versa. vCoPs are praised for their convenience, offering teachers the flexibility to access them at any time, catering to those with busy schedules (Ghamrawi, 2022). Additionally, vCoPs excel in accessibility, enabling global participation and facilitating connections among teachers from diverse backgrounds, potentially fostering collaboration and innovation (Grunspan et al., 2021).

In contrast, CoPs offer face-to-face interactions, which can foster relationship-building, trust, and the ease of obtaining in-person feedback and support (Luyten & Bazo, 2019; Prenger et al., 2019). However, they come with drawbacks, such as being time-consuming and expensive to organize, challenging to schedule for individuals with busy lives, and limited to participants in the same geographic area (Admiraal et al., 2021; Louis & Leithwood, 2021).

Additionally, vCoPs are more convenient and accessible, connecting individuals worldwide and being cost-effective (Ghamrawi, 2022). Nevertheless, they may lack the personal touch of CoPs, potentially making it harder to build relationships and trust online, and obtaining feedback and support from colleagues can be more challenging in a virtual setting (Grunspan et al., 2021).

The choice between CoPs and vCoPs depends on individual needs and preferences. Some may prefer the convenience and accessibility of vCoPs, while others may value the benefits of face-to-face interaction. Regardless of the choice, active and empowered teachers remain a crucial factor in both settings.

2.1 Teacher leadership

In the literature, a universally accepted definition of teacher leadership remains elusive (Wenner & Campbell, 2017). Scholarly discourse distinguishes between two primary forms of teacher leadership: formal and informal (Liu, 2021). Formal teacher leaders, occupying positions such as department heads or subject coordinators, are differentiated from informal teacher leaders, who exhibit leadership

attributes and fulfill leadership roles without holding formal positions (Ingersoll et al., 2017; Wenner & Campbell, 2017).

Regardless of their formal or informal roles, the literature underscores a multitude of advantages associated with teacher leadership (Ghamrawi, 2023; Ghamrawi et al., 2023; Muijs & Harris, 2006; Sebastian et al., 2017). Teacher leaders exert their influence beyond the confines of their classrooms, contributing to school-wide reform initiatives without forsaking their primary teaching roles (Harris & Jones, 2020). Within their classrooms, teacher leaders enhance the quality of students' learning (Ghamrawi, 2013a), leading to improved learning outcomes (Warren, 2021), and nurturing students' capacities (Ghamrawi et al., 2023; Ghamrawi, 2013b; Lumpkin, 2016).

Beyond their classroom responsibilities, teacher leaders actively contribute to school improvement initiatives, fulfilling diverse roles that support their colleagues (Murphy, 2019; Muijs & Harris, 2006; Ghamrawi et al., 2023), promote positive school cultures (Muijs & Harris, 2006), serve as role models for fellow educators (Muijs & Harris, 2006), take calculated risks (Ghamrawi, 2013a, b), and participate in school-based professional development efforts (Ghamrawi et al., 2023).

2.2 Teacher leadership roles and functions

Ghamrawi (2013b) enumerates 15 distinct leadership roles for teacher leaders, not necessarily linked to formal leadership positions. These roles encompass functions such as resource provision, instructional specialization, curriculum expertise, classroom support, facilitation of learning, mentoring, influencing, data coaching, active learning, catalyzing change, student counseling, community engagement, cultural development, effective communication, and advocacy for policy. This comprehensive list aligns, either partially or entirely, with the findings of numerous global studies conducted by researchers like Chen (2022), Killion and Harrison (2017), Lumpkin (2016), and Nguyen et al. (2020).

Many of the teacher leadership roles identified by Ghamrawi (2013b) are also ascribed to active teachers in virtual communities of practice (vCoPs). Teachers engaged in vCoPs are recognized for their authentic collaboration with peers, shared values, support for others through guidance and resource allocation, collaborative problem-solving, engagement in constructive debates, and the cultivation of a collegial learning environment (Andrade et al., 2022; Bolisani et al., 2020; Delgado et al., 2021; Ghamrawi, 2022; Kalir, 2022; Yuan et al., 2022).

Consequently, vCoPs serve as valuable tools for educators seeking collaborative opportunities, resource-sharing, and mutual learning. Nevertheless, the success of vCoPs hinges on various factors, including the empowerment of teachers through shared leadership. This entails granting teachers the opportunity to lead while making choices and decisions aligned with their professional expertise, values, and personal beliefs—a concept known as teacher agency. Consequently, this study explores teacher leadership in the context of vCoPs, with a specific focus on the interplay of teacher agency and distributed leadership, two concepts intimately connected to teacher leadership in the existing literature.

In fact, the confluence of teacher agency and distributed leadership in this study is theoretically underpinned by the recognition that both concepts are integral components of a dynamic and effective educational ecosystem. Teacher agency, rooted in the idea that educators possess the autonomy and capacity to make purposeful decisions in their classrooms, aligns with the notion that empowered teachers contribute significantly to student success (Brodie, 2021; Priestly et al., 2015; Riveros et al., 2012; Sang, 2020; Teng, 2019). Simultaneously, distributed leadership emphasizes the decentralization of leadership responsibilities, dispersing them across various stakeholders within an educational institution (Lumby, 2019; Stubblefield, 2019; Xiu et al., 2022). The theoretical synergy arises from the understanding that when teachers exercise agency within a distributed leadership framework, the collective intelligence and expertise of the entire educational community are harnessed, fostering a collaborative environment conducive to innovation and improved learning outcomes (Hilal et al., 2022; Polatcan, 2021).

2.3 Teacher agency

Teacher agency, as explored in recent literature, offers an alternative perspective on how teachers enact their practice and engage with policy (Priestley et al., 2015). It encompasses teachers' capacity to autonomously and collaboratively act on topics of interest (Teng, 2019). However, contextual constraints, such as accountability mechanisms and regulations, often limit teachers' agency, leading to instrumental engagement with policy and unforeseen outcomes (Van der Heijden et al., 2015).

The literature draws connections between communities of practice (CoPs) and teacher agency (Brodie, 2021; Riveros et al., 2012). CoPs, as argued by Riveros et al. (2012), provide a nurturing environment for teacher agency by facilitating collaborative learning, reflection, and collective problem-solving. Brodie (2021) similarly contends that CoPs support teacher agency through a collaborative context for learning, enabling teachers to collaboratively tackle challenges and develop innovative teaching strategies.

Sang (2020) provides an overview of teacher agency, defining it as teachers' ability to make choices and decisions in their work based on their professional knowledge, values, and beliefs. This empowers teachers to address the diverse needs of their students and contribute to educational policies and practices. Teacher agency, in Sang's view, represents empowerment, allowing teachers to take ownership of their work and shape their professional development.

Thus, there is a reciprocal relationship between CoPs and teacher agency. CoPs create a supportive environment for teacher agency, fostering collaborative learning, reflection, and problem-solving (Irgens et al., 2023). Engagement in CoPs empowers teachers to exercise agency in their professional decisions and learning (Geletu & Mihiretie, 2023).

Conversely, teacher agency can also impact the development and sustainability of CoPs (Zeivots et al., 2023). Empowered teachers with a sense of agency are more likely to actively participate in CoPs, contribute to collective problem-solving, and support the establishment of shared visions and goals (Ghamrawi, 2022).

2.4 Distributed leadership

Distributed leadership involves multiple individuals engaging in leadership activities to achieve shared goals within a specific context (Gronn, 2002; Spillane, 2006). It departs from traditional leadership notions tied to a formal position or single leader, emphasizing leadership emerging within a network rather than rigid hierarchy. This model shares leadership responsibilities and decision-making across individuals or groups (Harris, 2014). In this model, leadership roles are distributed among team members, each contributing unique skills (Ghamrawi, 2010, 2011). This approach fosters collaboration, creativity, innovation, and team member engagement (Diamond & Spillane, 2016).

Distributed leadership empowers teachers to assume leadership roles, encouraging their active participation in learning communities within their schools (Liljenberg, 2015), which in turn contributes to school improvement initiatives (Ghamrawi, 2013a, b; Harris, 2014). It supports teacher leadership development (De Nobile, 2021; Harris & Jones, 2020; Nguyen et al., 2020), by establishing a culture of trust and respect (Ghamrawi, 2011). In such cultures, teachers' capacity is built through professional development and collaborative support (De Nobile, 2021). Teachers require opportunities like mentoring, coaching, and collaborative inquiry (Ghamrawi, 2011), often crafted by school principals (Lumby, 2019) and middle leadership (Ghamrawi, 2013b).

While the literature suggests that distributed leadership enhances CoPs' functionality (Stubblefield, 2019), offering a theoretical framework for understanding professional collaboration in teachers' CoPs (Azorín et al., 2020), it does not explain how it promotes teacher leadership in such communities.

3 Method

3.1 Research design and participants

This study explored the development of teacher leadership within Virtual Communities of Practice (vCoPs), with a specific emphasis on the interplay between teacher agency and distributed leadership. Employing a phenomenological research design, the study embraced a qualitative approach aimed at unraveling individuals' lived experiences and the significance they attribute to those experiences (Williams, 2021). Phenomenology seeks to explore the essence of a given phenomenon from the participants' standpoint, delving into the meaning they derive from their experiences and their perceptions of such phenomena (Neubauer et al., 2019).

To gather data, semi-structured interviews were conducted with 12 participants (refer to Table 1) who are members of a Virtual Community of Practice (vCoP) designed to cater to Arabic-speaking individuals worldwide. This vCoP was initiated during the pandemic with the primary objective of supporting teacher training, particularly focusing on the delivery of online learning. Notably, the community has persisted beyond the pandemic and has evolved into a thriving platform for over 1600 Arabic-speaking teachers from around the world. The vCoP provides various

Table 1 Characteristics of the sample

Demographics		No of participants
Gender	Male	5
	Female	7
Age (years)	Less than 25 years	1
	26–35 years	4
	36–45 years	6
	46 years and above	1
Experience in teaching (Years)	Less than 4 years	0
	5–9 years	3
	10–14 years	4
	15–19 years	4
	20 years and above	1
Duration of membership on the vCoP	[1–2[years	5
	[2–3] years	6
	< 3 years	1
Country	China (C)	1
	Egypt (E)	1
	France (F)	1
	Iraq (I)	1
	Lebanon (L)	2
	Oman (O)	1
	Qatar (Q)	1
	Romania (R)	1
	United Arab Emirates (UE)	1
	United Kingdom (UK)	1
	United States of America (US)	1

resources, including weekly webinars, discussion boards, free educational materials, and polls, facilitating active member engagement in decision-making related to the hosted activities.

Participant selection was based on a set of specific criteria, encompassing: (1) a membership duration of more than one year within the vCoP; (2) demonstrated leadership engagement within the vCoP, including leading problem-solving discussions, conducting workshops, and providing support to colleagues by serving as coaches and mentors; and (3) self-identification as individuals embracing the role of teacher leaders. These criteria were established to ensure that participants had a substantial and active involvement in the vCoP, particularly in leadership capacities, and self-identified as contributors to the community's teacher leadership dynamics.

The first and second criteria were fulfilled by soliciting data from the vCoP administration, which utilized 'Google Analytics' to examine the digital activities

of each user on the platform. This review identified vCoP members who met the specified criteria for assuming teacher leadership roles. The administration followed the criteria provided to them in order to pinpoint individuals actively engaging in teacher leadership within the vCoP. The third criterion was satisfied by extending an invitation to all teachers in the vCoP, prompting them to express whether they considered themselves teacher leaders. This inquiry was made on one of the vCoP's discussion boards, accompanied by a request for those who identified as teacher leaders to provide supporting evidence for their self-identification.

Subsequently, 20 teachers self-identified as teacher leaders and substantiated their roles with evidence. The evidence presented encompassed diverse contributions, such as sharing links to resources they had created, conducting workshops, enriching curriculum resources, active participation in discussion boards to aid fellow teachers in resolving classroom challenges or supporting student learning, and effective utilization of data. Although all 20 teachers were invited to participate in the study, only 12 expressed interest. The characteristics of the participating sample are detailed in Table 1.

3.2 Interview schedule & data analysis

A semi-structured interview schedule was created specifically for this study. Interviews were conducted on one-to-one basis. On average, each interview had a duration of 30 min and was conducted virtually using Microsoft Teams. Prior to the interview, each participant provided electronic consent by signing an informed consent form. The interview schedule is presented in Table 2.

For ethical considerations, participants are identified using the formula P-C, where P stands for number given for the participant, and C stands for the country he/she were living in. As an example, P3-Q represents a participant given the number three, coming from Qatar. This designation ensures the anonymity of participants since the countries represented had vCoP registrants ranging from 16 to 568, with the lowest (China) having 16 and the highest (Lebanon) having 568.

The qualitative data collected from the interviews was analyzed using a theme-based approach. The analysis process involved several stages, including open coding, axial coding, and selective coding, which are recommended in the literature (Williams & Moser, 2019). In order to ensure the validity of the codes and themes, peer debriefing was employed, with two researchers independently coding the data and then comparing and agreeing on the codes and themes (Scharp & Sanders, 2019).

During the analysis process, the interview transcripts were segmented into smaller units and assigned labels (codes), which were constantly compared and contrasted for similarities and differences. The next stage involved axial coding, whereby the codes were classified into categories and linkages were constructed between them. The final stage involved selective coding, which enabled the researchers to elaborate and formulate the story of the case by continuing the axial coding at a higher level of abstraction (Flick, 2009). This process supported the researchers in constructing meaning and telling a story using the collected data (Charmaz, 2014).

Table 2 The interview schedule

	Introductions	Purpose
1	-Introducing the study, researchers, research questions, and the purpose of the interview. -Explain the consent process and confidentiality of the interview.	<ul style="list-style-type: none"> • Establishing repertoire
2	-Do you consider yourself as a teacher leader on the vCoP? Why? -Can you describe a specific instance where participation in the virtual community of practice supported your teacher leadership skills ?	<ul style="list-style-type: none"> • Making sure that the participant bear a teacher leader image for him/herself. • Get examples pertaining to teacher leadership practices of participants in the vCoP.
3	-Describe the degree directing your professional growth, and that of other teachers on the vCoP, impacted your teacher leadership. Can you give examples?	<ul style="list-style-type: none"> • Exploring how teacher agency impacted participants' teacher leadership skills.
4	-In what ways have distributing leadership to members of the vCoP impacted your teacher leadership skills? Can you give examples/ state any incident?	<ul style="list-style-type: none"> • Exploring how distributed leadership impacted participants' teacher leadership skills.
5	-Is there anything else you would like to add about virtual communities of practice and teacher leadership development? -Thank the participant for their time and contributions to the study	<ul style="list-style-type: none"> • Adjourning.

4 Findings

The sub-themes generated from the theme-based analysis that was carried out on interview data are represented in Table 3.

4.1 Potential of vCoPs in developing teacher Leadership

Findings suggest that teachers in the vCoP were given the chance to grow and develop their leadership skills through peer-to-peer learning. By participating in a vCoP, teachers contended that they shared expertise with other teachers. This in effect helped them develop the confidence and skills set needed to lead on other teachers' professional development.

'The best part about being a member on this vCoP is the opportunity I got to interact with other teachers, and exchanging learning and expertise with them. I got the chance to facilitate the learning of so many teachers from several countries' (P7-O).

'I believe that I became a leader through this vCoP. The fact that I found my experience valuable to others, increased my self-image and confidence in my educational expertise. This in effect encouraged me to support other teachers, share self-developed learning resources with them, and collaborate with them around problem-solving.' (P5-L).

Moreover, teachers thought that the vCoP provided a platform for teachers to collaborate on projects, share resources, and work together on common goals. Such collaboration was viewed as means for enhancing their leadership skills such as communication, and teamwork.

'I think that the vCoP's key strength in developing teacher leadership lies in the potential for collaboration between teachers. It supports team building and collaboration' (P1-C).

Table 3 Theme-based analysis of Focus Group Interviews

Areas	Themes	Frequencies /12
Potential of vCoPs in developing teacher leadership	• <i>Supporting peers.</i>	12
	• <i>Collaborating with peers</i>	12
	• <i>Networking with peers.</i>	8
	• <i>Innovating with peers .</i>	7
Role of teacher agency in developing teacher leadership in vCoPs	• <i>Taking ownership of learning.</i>	12
	• <i>Engaging in self-directed professional development.</i>	9
	• <i>Promoting collective leadership.</i>	
Role of distributed leadership in enhancing teacher leadership in vCoPs	• <i>Empowering teachers.</i>	12
	• <i>Building capacity.</i>	11
	• <i>Encouraging risk-taking.</i>	10

‘The vCoP helped me develop my communication skills which was integral for effective collaboration with other teachers. Through effective communication, I was able to influence other teachers try out things they never tried or even dared to try before ’ (P12-US).

Furthermore, the study suggests that the collaboration of teachers on the vCoP supported them in developing professional networks. These networks provided teachers with the opportunities to e-meeting more teachers and learning from them, sharing knowledge and experiences, and developing leadership skills.

‘The vCoP helped me build a professional network where the colleagues I got to connect with on the vCoP, supported me in getting connected to other teachers in their own networks. Through these networks, I am now invited to speak in e-conferences, disseminate virtual workshops, and many others ’. (P10-UE).

On another hand, the membership in the vCoP was believed to be promoting teacher leadership by fostering teacher innovation. Innovation was viewed to support teacher leadership by creating an environment that encourages experimentation, and creativity. By leveraging innovation, teacher leaders contended that they led their colleagues in developing new ideas and approaches to teaching, improving student outcomes, and driving educational excellence.

‘I would say one word summarizes how the vCoP enhances teachers’ leadership skills: innovation. It is a community where we are allowed to develop new ideas, and test and experiment them, without being sacred of criticism or failure’ (P3- F).

4.2 Role of teacher agency in developing teacher leadership in vCoPs

Findings suggest that teacher agency plays a role in developing teacher leadership in vCoPs by empowering teachers to take ownership of their learning, encouraging experimentation and innovation, promoting collaboration and knowledge sharing, and developing a culture of continuous learning.

First of all, teachers expressed that, unlike their school settings, they were able to take ownership over their own learning in the vCoP. They suggested that they were proactive in seeking out learning opportunities and setting their own learning goals. Through this, they seemed to be expanding their leadership skills.

‘As an active teacher in the vCoP, who has a say in its activities, I feel I am fully responsible for my learning and also that of the group I collaborate with, and I work diligently to deliver to the best of my potentials which are growing in an unprecedented mode since I belonged to the vCoP ’ (P8-Q).

Secondly, another theme that is interrelated with the latter is self-directed professional development. Self-directed professional development emphasizes the individual’s ability to direct his or her own learning, provided they reflect a sense of ownership over their learning.

'As vCoP member, I am able to decide on what I need to learn, and design my professional development accordingly. I think this is an instance where I am exhibiting leadership skills- leading the self ' (P4-I).

'I believe that I do decide the what, why, and when – of my learning on the vCoP. It is a responsibility that expands my leadership skills' (P2- E).

Thirdly, the vCop was viewed to be promoting collective leadership. Teachers suggested that they encouraged and supported others to take on leadership roles and responsibilities; sharing their expertise and experience, and co-creating knowledge and solutions to complex educational challenges.

'I think teacher leadership in the vCoP is like a snowball. It grows with every effort each one of us puts in supporting other teachers. As a result, both parties grow their leadership skills. So, the leadership skills of both I and the peers I am collaborating with, are strengthened continuously ' (P11-UK).

4.3 Role of distributed leadership in enhancing teacher leadership in vCoPs

Findings suggest that vCops provide a platform for educators to connect and collaborate with each other, regardless of their position within their institutions. This is in contrast to traditional hierarchical structures, where teachers may feel restricted in their ability to share their ideas and perspectives. This empowers teachers by providing them with equal opportunities to contribute to discussions and decision-making processes, regardless of their job titles or seniority.

'Through the vCoP I can interact with any peer who is willing to open up and collaborate. Those hierarchies that we confront in school do not exist in vCoPs. We are all encouraged and empowered to become teacher leaders' (P9-R).

'The vCoP, is a space where all members feel valued and capable of contributing' (P6-L).

Moreover, the vCoP was viewed to contribute to the capacity building of teachers, through the development of leadership skills of active members, who are willing to lead.

'I think that any teacher who displays willingness to lead will be given the needed space to do so. This space allows us to develop our leadership skills, because of the responsibility that we feel has fell on our shoulders' (P3-F).

' I believe that when you show some form of interest in leading certain activities, you are welcomed to do so and you will receive all the needed encouragement and the space to do so. You feel that your leadership skills, such as communication, collaboration, and problem-solving are augmented' (P1-C).

Furthermore, the vCoP was considered to elevate teachers' tendencies to act as risk takers. In fact, teachers contended that vCoPs provided them a safe space to experiment with new teaching methods, share their experiences, and receive feedback from their peers. This sense of community and support encouraged them to try

new approaches, and learn from each other's successes and failures, which inspired them to take risks and try new ideas.

'I do not feel afraid of failure in this community [vCoP]. I feel safe to try things I would not dare to try in my school, because of the negative climate that prevails there. For example, I never delivered a workshop for peers in my schools, because I fear failure and shaming there. This is not the case in the vCoP, where a positive climate supports me to take risks and try new routes' (P12-US).

5 Discussion

This study delved into the potential of Virtual Communities of Practice (vCoPs) as fertile ground for nurturing teacher leadership, guided by two central research inquiries. The first inquiry investigated the role of teacher agency in cultivating teacher leadership within vCoPs, while the second explored the influence of distributed leadership in this endeavor.

The findings underscored the substantial capacity of vCoPs to foster teacher leadership through various avenues, including opportunities for peer-to-peer learning, the cultivation of collaborative environments, the expansion of professional networks, and the nurturing of innovation. These functions within vCoPs closely align with the multifaceted roles ascribed to teacher leaders, as previously expounded in studies by Ghamrawi (2013a, b), Hairon and Goh (2015), and Liu (2021).

In fact, parallel to Harrison and Killion (2007), this study suggests that teacher leaders functioned as instructional guides, mentors, and advocates for student learning, while fostering collaborative professional development, data-informed decision-making, and innovation. Moreover, teacher leaders in vCoPs were facilitating ongoing growth and collaboration among their fellow teachers in a professional setting, as stipulated by Liu (2021). vCoPs have been recognized as supportive platforms for teacher-teacher collaborations across various educational facets, spanning resources, instruction, curriculum, and student learning. These align with the responsibilities of teacher leaders as outlined by Ghamrawi (2013a, b).

Additionally, the study highlighted the pivotal role of Virtual Communities of Practice (vCoPs) in (1) fostering collegiality and collaboration, (2) supporting teacher growth and development, and (3) instigating transformations in teaching practices, reflecting the attributes of teacher leadership as outlined by Hairon and Goh (2015). In alignment with Liu's (2021) findings, this study proposes that vCoPs foster the growth and nourishment of teacher leadership by cultivating a nurturing culture devoid of threats or shaming, thereby creating an environment conducive to growth and collaboration.

On a parallel note, the study's findings align with prior research emphasizing the capacity of Communities of Practice (CoPs) to foster teacher leadership (Oppi & Eisenschmidt, 2022; Wilson, 2016). Similar to Wilson's (2016) exploration, this study revealed the significance of shared and supportive leadership, collective learning, shared personal practice, and supportive conditions within Virtual Communities of Practice (vCoPs). Furthermore, echoing Oppi and Eisenschmidt's (2022) findings, this study posited that an essential facet of teacher leadership development within CoPs lies in educators' ability to support their colleagues' professional growth.

In another vein, the study illuminated the pivotal role of teacher agency in shaping teacher leadership within Virtual Communities of Practice (vCoPs) by fostering a culture of self-directed professional development and cultivating collective leadership. Notably, this shared characteristic is observed in both vCoPs and traditional Communities of Practice (CoPs) that were examined by Brodie (2021). Educators with heightened levels of agency within vCoPs embrace ownership of their learning, define their professional objectives, and proactively seek opportunities for continuous development, echoing the essence of teacher agency within CoPs (Brodie, 2021; Riveros et al., 2012).

Through this process, educators become proactive contributors to the co-creation of new knowledge and innovative solutions to intricate educational challenges, aligning with the notion of teacher agency within Communities of Practice (CoPs) (Riveros et al., 2012). Additionally, by participating in collaborative endeavors, sharing their expertise, and exchanging experiences, educators with substantial agency promote collective leadership and foster a shared understanding of effective teaching and learning practices—paralleling the findings related to teacher agency within CoPs (Polatcan, 2021).

The study also underscored the instrumental role of distributed leadership in dismantling traditional hierarchies and promoting shared leadership in diverse ways within vCoPs. The hallmark of vCoPs is the dissolution of hierarchical structures, creating an egalitarian playing field where any educator is welcomed to lead and share their expertise, transcending formal positions. Consequently, members are encouraged to participate actively in discussions, share knowledge, and embrace leadership roles within the community, mirroring the facets highlighted in studies by both Stubblefield (2019) and Wilson (2016) in the context of CoPs.

Within vCoPs tailored for educators, members can freely collaborate, exchange experiences, and share ideas, emancipated from the constraints of traditional hierarchies. Novice teachers can learn from seasoned colleagues, and together, they can shoulder leadership responsibilities in organizing and facilitating discussions and activities within the community, cultivating a shared sense of ownership and commitment among members. This synergistic leadership approach fosters sustained engagement and participation within the vCoP, in line with the findings by both Xiu et al. (2022) and Carmi et al. (2022), albeit within the context of traditional CoPs.

Moreover, vCoPs offer a low-stakes environment for educators to experiment with new teaching strategies, receiving constructive feedback without the apprehension of negative repercussions. This liberty to innovate and take calculated risks bolsters innovative teaching practices. In fact, vCoPs provide opportunities for educators to collaborate with like-minded peers facing similar challenges, thereby instigating them to explore uncharted territories and experiment with novel concepts. These insights parallel the findings by Liu et al. (2022), albeit within the context of CoPs.

5.1 Conceptualizing teacher leadership in vCoPs

Teacher leadership in virtual communities of practice undergoes a transformative redefinition, knottily tied to the distinctive features of teacher agency and distributed leadership that flourish within these digital demesnes, often unavailable in traditional physical settings. In this virtual landscape, teacher agency takes center stage as educators navigate

and curate their professional development, exercising greater autonomy in decision-making regarding instructional strategies and collaborative endeavors. Simultaneously, distributed leadership unfurls in a decentralized fashion, transcending physical constraints, as teachers seamlessly share leadership responsibilities across geographic boundaries. The virtual environment empowers educators with a dynamic platform where collaborative expertise flourishes, allowing for the cross-pollination of ideas and practices. Consequently, teacher leadership in virtual communities of practice emerges as a collective, digitally-enabled phenomenon, amplifying teacher agency and distributed leadership to foster a global, collaborative, and innovative educational landscape.

5.2 Limitations

This study, like any other, has certain limitations. Firstly, the focus on a single virtual community of practice (vCoP) prompts consideration regarding the generalizability of findings to other collaborative online spaces. However, it's important to note that diverse vCoPs may showcase unique dynamics, providing an opportunity for further exploration rather than necessarily being a limitation. Secondly, while the phenomenological research design is valuable for capturing lived experiences, it introduces a level of subjectivity that may influence the generalizability of findings, given individual biases. Moreover, the reliance on semi-structured interviews as the primary data collection method may have some limitations in fully capturing the breadth and depth of teacher leadership experiences within vCoPs. Additionally, the study does not explicitly address the temporal aspects of teacher leadership development within vCoPs, which overlooks the potential impact of the evolving nature of virtual communities over time.

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Data availability Data used to develop this study are anonymous, and therefore it is not available for the public. This is part of what we sign on for the IRB at Qatar University.

Declarations

Ethical clearance This study gained the ethical approval of the IRB at Qatar University number QU-IRB 1883-EA/23.

Informed consent All participants in this study were informed of the purpose of the study and how data will be used. They were assured that their identities would remain anonymous across the study.

Conflicts of interest No potential conflict of interest was reported by the author(s).

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