

School Culture Promoting Innovation – A Systematic Literature Review

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Abstract

Innovation is imperative for sustainability and competitiveness in the contemporary interconnected global economy. Educational innovation has the potential to restructure learning outcomes and educational outputs. However, creativity and innovation necessitate a culture (a conducive environment) that supports and fosters growth; innovation alone is insufficient. This review aims to identify the various theories and instruments utilized to measure school culture that promotes innovation and to explore diverse dimensions of school culture that play a crucial role in fostering innovation from the perspective of educators. The Scopus database served as the main research source for this review. The researchers used the keywords 'School Culture,' 'Cultural factor' and 'Innovation' to extract literature published between 2020 and 2023. PRISMA technique was used to select the research papers that are included in this review paper. A total of 17 articles from 2020 to 2023 were chosen and met the requirements to be included in this review study. This study focused on theories to gain a deeper understanding of how school culture promotes innovation from the perspective of teachers. The study identified various measurement tools to assess the school culture promoting innovation from the perspective of teachers. Furthermore, we emphasize the dimensions and factors of the school culture that support the growth of innovation from the perspective of teachers. The review's contribution is to pinpoint the appropriate theories and tools that are used to gauge school culture that influences the promotion of innovation. Learning about the dimensions of school culture that foster innovation broadens the researcher's perspective. Numerous evaluations have been done to determine the various aspects of school culture; however, this is the first study to examine the different tools to measure school culture to foster innovation from the teachers' perspective.

Keywords: School culture, Cultural factor, Innovation.

Paper Type: Literature Review

Introduction

Education is widely acknowledged as a conservative social structure, often resistant to change due to teachers' reluctance to adopt new practices (Fuad, et al., 2022; OECD, 2016; Richardson, 2021). In a globalized economy, innovation act as a driver of competitiveness and a prerequisite for sustainable future (Serdyukov, 2017). It has become an crucial indicator of educational success (Blömeke, et

al., 2021), capable of enhancing the quality of outputs and learning outcomes, although it is still a subject of ongoing debate (OECD, 2016). Innovation in education, broadly defined as the generation and application of novel concepts, has gained prominence in recent years (Blömeke, et al., 2021). It is a planned, intentional process that fosters systemic change at multiple levels, including macro (entire education systems), meso (teachers, staff, and learners), and micro

(classroom practices and social interactions) (Pietsch, et al., 2024). Even though change is a prerequisite for innovation, not all changes qualify. As such, innovation can be contextualized to deliberate, intentional changes that have practical value and benefit the educational community.

Innovation in schooling generally serves three core functions – it is fundamental in nature, goal-driven, and designed to improve the existing system (Pietsch, et al., 2024). As such, schools are required to nurture environments that foster knowledge creation, an innovation culture, and creative thinking among 21st-century learners. Teachers are the most effective agents of change (Holdsworth & Maynes, 2017) and their adaptability plays a crucial role in supporting student learning (OECD, 2014). Teacher innovation is essential for improving both educational processes and outcomes (Liu, et al., 2024; OECD, 2016). However, innovation alone is not sufficient, as it must be embedded with a culture that is receptive to new ideas, encourages creativity, and support growth (M. Fuad, et al., 2023; Noor, et al., 2022). A positive and supportive culture fosters the development of new ideas, curiosity, and risk-taking (Cankar, et al., 2012; Fuad, et al., 2022). Culture is shaped by history and social context, influencing member's behaviours and mindsets (Roffeei, et al., 2018). It is built upon multiple levels, including values, beliefs, norms, and assumptions, all of which are needed to be communicated effectively with all stakeholders in an organization (Roffeei, et al., 2018). Culture significantly influences individual behaviour, which in turn affects their potential to contribute meaningfully to innovation (Fuad et al., 2022; Roffeei et al., 2018). It shapes how people respond to change, collaborate, assess risk, and interpret opportunities (Kaasa & Vadi, 2010). Schools serve as social and psychological environments where teachers develop a 'sense of practice,' 'professional efficacy,' and a 'professional community' (Day, 1999). Each

school has its own distinct culture, shaped by a symbolic order of 'educational codes' (Ukpabio, et al., 2023) that are negotiated and reinterpreted by members based on local realities, individual's standards and practices. These codes guide expectations, roles, and behaviours within schools (Waters & Orange, 2022).

School culture comprises deeply rooted assumptions, norms, and values that define expected behaviour for all members, including communication styles, attire, peer interaction, and attitudes toward students (Munifah & Purwaningrum, 2022; Rosadi, 2023; Yli-Panula, et al., 2022). It motivates teachers to embrace innovation leading to educational progress (Amtu, et al., 2020). The connection between organizational culture and innovation is well-established, where organizational values that support learning and involvement among decision-makers, directly influence the creative capacity of individuals and institutions (Caliskan & Zhu, 2019; M. Fuad, et al., 2023; Caliskan & Zhu, 2020).

Despite literature about school culture and its relationship with innovation, there is no universally accepted definition. It is generally recognized, however, that each school's culture is distinct (Tłuściak, et al., 2017). Schools are formal organizations where members interact based on roles, responsibilities, and shared expectations. Over time, these interactions lead to the formation of implicit standards, rules, and values that become the foundation of the school's culture. Members of the institution internalize these assumptions and behave accordingly. Thus, school culture can be viewed as the sum of longstanding, unspoken norms and shared understandings that guide behaviour and interaction.

Even though a number of empirical research studies have explored school culture in relation to school effectiveness, teacher leadership, emotional intelligence, and professional development (Eger &

Egerová, 2022; Ismail, et al., 2022; Jafar, et al., 2022; Kalkan, et al., 2020; Limbong, et al., 2023; McChesney & Cross, 2023; Ozer & Popp, 2022; Ozgenel, 2020; Ukpabio, et al., 2023), few systematic reviews have examined the conceptual foundations, theoretical frameworks, measurement tools, and dimensions of school culture.

Therefore, a systematic review of empirical studies in education is urgently needed to explore the school culture in depth, especially its assessment methods, and the dimensions that support innovation from the teachers' perspective. Such insights can inform all stakeholders and help cultivate a school environment that fosters creativity, professional growth, and effective educational innovation.

Review Questions

The purpose of this systematic literature review is to provide answers to the following questions:

1. Which theoretical frameworks are used to measure the school culture promoting innovation?
2. What tools are used to measure the school culture promoting innovation?
3. What are the dimensions of the innovation promoting school culture?

Methodology

The author employed a systematic literature review to ensure a structured, transparent, and unbiased approach to answering the research questions. As such, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline has been adopted to report the number of studies identified, screened, excluded with reasons, and finally included (Lame, 2019). This process minimizes selection bias by considering all empirical evidence that meets predefined criteria.

Search strategy

Initially, the researchers performed an extensive review of literature pertinent to 'school culture' to develop a clear understanding of the concept, formulate research objectives, and identify appropriate keywords. The search strategy included synonyms and related terms from social sciences to ensure comprehensive coverage. Three subgroups, 'School Culture,' 'Innovation,' and 'Cultural Factors' were formed based on the research objectives. Synonyms within each subgroup were connected using 'OR,' while the subgroups were linked using the Boolean operator 'AND.' The complete keyword chain is presented in Table I.

Table I: The chain of keywords for data searching

Search Groups	Search Query (Title, Abstract, Keywords)
School culture, Innovation, Cultural factors	TITLE-ABS-KEY ((school) AND (culture)) AND PUBYEAR > 2019 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA , "SOCI")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (EXACTKEYWORD , "School Culture")) OR LIMIT-TO (EXACTKEYWORD , "Innovation") OR LIMIT-TO (EXACTKEYWORD , "Cultural Factor")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (OA , "all"))

Retrieval of Articles

The researchers used the Scopus database to identify high-quality literature. As such, the search field was restricted to 'title,' 'abstract' and 'keywords' fields to ensure a reliable and exhaustive search within the

database. Subsequently, the search was limited to social sciences discipline, article-type documents, English language, and open-access publications. Moreover, the time frame was restricted to 2020–2023 to examine how schools adapted or transformed

their culture to drive innovation in response to educational gaps following the COVID-19

pandemic. The article retrieval criteria are detailed in Table II.

Table II: The criteria for retrieval of articles

Databases	Article parts search	Field searched	Search string	Time Space
SCOPUS	TITLE-ABS-KEY (Title, Abstract, Keywords)	Social Science	School culture, Innovation, Cultural factors	2020-2023

Source: Authors' creation

Selection of Relevant Articles

The author followed a four-step selection process, including identification, screening, eligibility assessment, and inclusion (Fig. 1). Prior to selection, all retrieved documents were exported into a CSV file. Subsequently, the researchers manually screened the titles, abstracts, and full texts to exclude irrelevant studies.

Inclusion Criteria

The evidence synthesis included all studies addressing any of the research objectives. Specifically, articles were selected if they met at least one of the following criteria, including discussed school culture from the perspective of teachers and its role

in promoting innovation, were grounded in relevant theoretical frameworks, or provided detailed descriptions of tools used to measure school culture.

Exclusion

Studies that focused primarily on student-related aspects such as behaviour modification, academic performance, mental health, or growth mindset were excluded. Additionally, articles addressing LGBTQ-friendly school culture, teacher emotional well-being, or general teacher well-being were not considered. In brief, any study that did not align with the research objectives of this review was excluded. The detailed inclusion and exclusion criteria are presented in Table III.

Table III: The inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Articles published in SCOPUS-indexed journals from 2020-2023.	Do not have the term 'School culture' or 'Innovation' or 'Cultural factors' in the article title, keywords, or abstract.
Open access articles type documents.	Publications from fields other than social science are not included.
With keywords such as 'School culture' or 'Innovation' or 'Cultural factors' in the article title, keywords, or abstract.	Written in languages other than English are not included.
Articles published in English.	That talked about LGBTQ-friendly school culture, teachers' emotional well-being, teacher's well-being, and student's perspective were excluded
Articles that talk about the school culture from the perspective of teachers and those that promote innovation culture in schools are included.	--
Articles that talk about school culture are based on some theories, used tools, and its dimensions.	--

Source: Authors' creation

As such, literature scrutiny followed a rigorous approach to ensure comprehensive and unbiased selection. Initially, 119 articles were retrieved from the database. Subsequently, in the screening phase, 76 articles were excluded, leaving 43 for eligibility assessment. Following full-text

evaluations, 26 articles were excluded due to the defined inclusion criteria. After completing the preliminary screening and quality checks, a final set of 17 articles were selected for inclusion in the systematic review. The entire procedure is outlined in Figure 1. The researcher used the TCCM

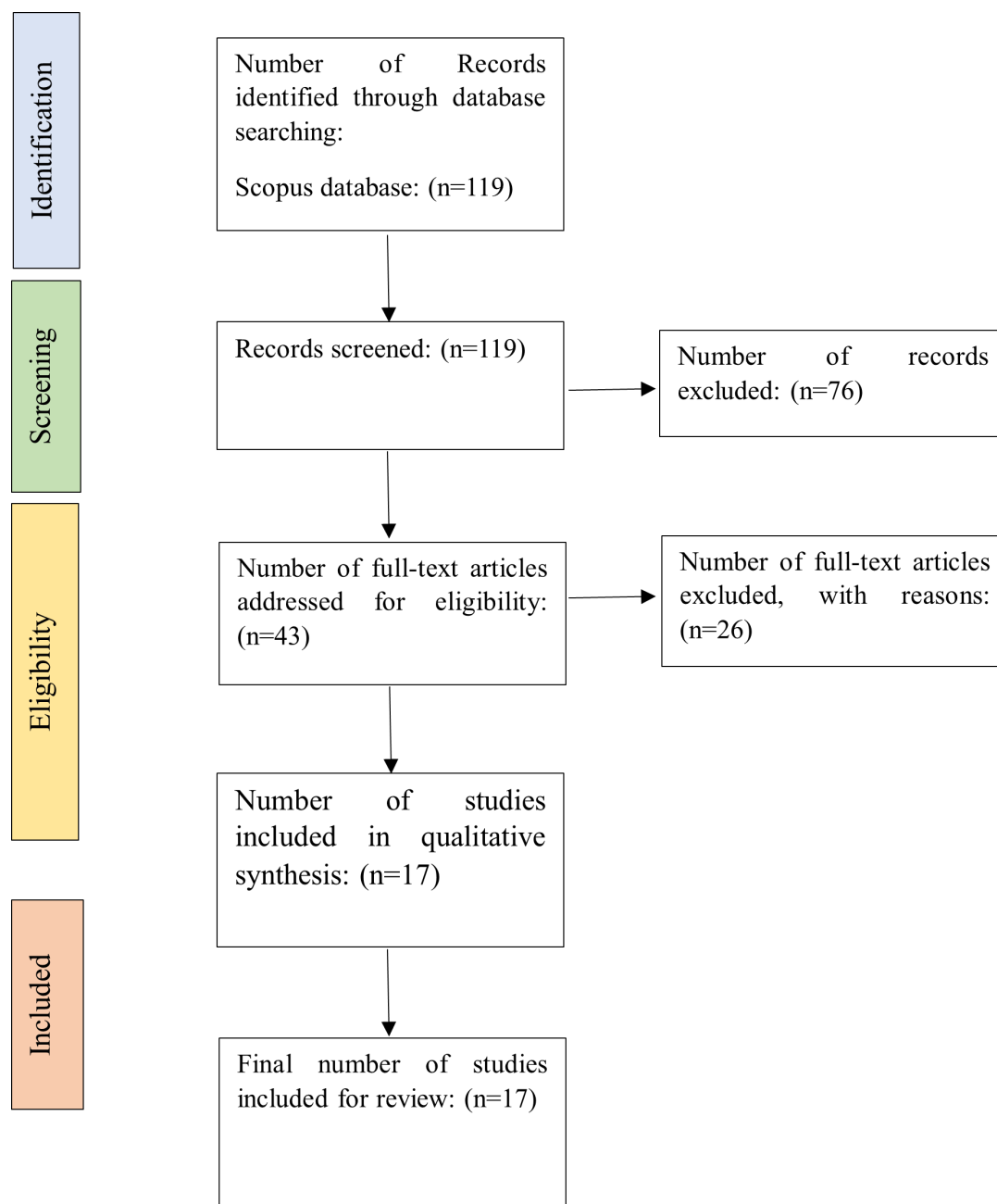


Figure 1: PRISMA Framework

Source: Authors' creation

(Theory, Context, Characteristics, Methods) framework for structuring the findings based on domain relevance (Paul, et al., 2024). The Theory (T) component refers to the theoretical foundations and paradigms that explain the interrelationships among various constructs. Context (C) pertains to the specific areas or circumstances that influence the research environment. Characteristics (C) refer to the components of a construct and their relationships with other relevant variables. Methods (M) include details such as the sample, research design, measurement tools, and analytical techniques employed (Paul, et al., 2024). The synthesis of findings from the 17 selected studies is systematically structured using the TCCM framework, as detailed in Table IV of the appendix.

Results

1. Theoretical frameworks used to measure the school culture promoting innovation

Most studies focused on school culture dimensions and measurement tools, with few examining it from a theoretical perspective. For instance, social constructivism theory was used to explore innovative organizational culture among award-winning teachers. One study identified three key elements, including operational planning (analysing risks and strengths before implementation), execution of activities (collaborative decision-making and action for a common goal), and motivating other teachers (appreciating colleagues' creative potential) (Jakavonytė-Staškuvienė & Barkauskienė, 2023). Kruger, M., & Cojocar, D. (2022).

Additionally, Kruger, M., & Cojocar, D. (2022) applied Taylor's Interaction and Organizational Theory and Bronfenbrenner's Ecological Systems Theory to assess the Sociological Teachers Teaching Yoga programme on school culture and found that ecological factors like individual traits, family, and

educational environments influenced learning and behaviours, especially their self-efficacy, ultimately affecting school culture.

2. Tools used to measure the school culture promoting innovation

Among the 17 studies the researcher reviewed, only 11 demonstrated the use of quantitative tools to measure innovation-promoting school culture based on various dimensions, and only two studies used theories to examine the innovation-promoting school culture from the perspective of teachers.

Self-constructed tools for measuring school culture promoting innovation

Some researchers developed self-constructed quantitative tools to measure the school culture's role in fostering innovation. As such, Enefiok, et al. (2023) created a school culture questionnaire based on the Georgia Leadership Institute for School Improvement (GLISI) (2016) template to assess the impact of managers' emotional intelligence (EI) on school culture. Similarly, Suparno, et al. (2023) developed a 5-point Likert scale tool to examine how principals' innovation, intrapreneurial leadership, and school culture influence teachers' innovation. This tool measured three variables, including innovation, intrapreneurial leadership, and school culture, using a total of 20 items. The innovation variable included aspects like developing methods, strategy, service, and opportunity, while the intrapreneurial leadership variable covered giving opportunities, encouraging risk-taking, being proactive, and developing technology. The school culture variable included values, applied norms, traditions, and beliefs.

Standardized tools for measuring school culture promoting innovation

The extensive literature on school culture underscores the development of standardized measurement tools,

typically created through pilot studies and factor analysis, followed by comprehensive assessments of validity and reliability (Gruenert, 1998). While some researchers have designed new instruments based on these rigorous methodologies, others have utilized previously validated tools in their studies. A detailed discussion of the prominent questionnaires highlighted in the research literature is provided below.

Social relation perspective questionnaire

Among the 11 studies reviewed, 9 used standardized tools to examine school culture. The School Cultural Elements Questionnaire (SCEQ) was developed by Cavanagh (1997) to explore the link between Professional Learning Community (PLC) and school culture (Jafar, et al., 2022). Based on the cultural element model, the original eight dimensions were refined to six after factor analysis (DeVaney, et al., 2012), measured through 42 items, including, professional values, emphasis on learning, collaboration, transformational leadership, shared planning, and collegiality (R. Cavanagh, 1997a; R. F. Cavanagh & Dellar, 1998; Jafar et al., 2022). Collegiality pertains to a culture of solidarity, respect, and professional support. The emphasis on learning highlights the learning as a priority for both students and teachers. The attribute Professional values signify teachers' commitment to effective pedagogy and professional, cheerful behaviour. Share planning relates to the joint development of a unified vision to enhance school programmes. Transformational leadership can be contextualized as inspiring through strong interpersonal connections and shared goals (Cavanagh & Dellar, 1998; Jafar et al., 2022).

The Revised School Culture Element Questionnaire (RSCEQ), created by

Thomas in 2012, was employed to gauge the school's culture. It is divided into three dimensions: Professional Commitment (6 items; with internal consistency = .929), Collegial Teaching and Learning (7 items; .922), and Shared Leadership and Vision (7 items; .832), with a high overall reliability (Cronbach's α = .924) (Mohamed & Zainal Abidin, 2021).

To measure the social dimensions of the school's culture, the researcher used the Scale of the State of Relations in the Institution, comprising 13 items assessing relationships among teachers, between teachers and professional colleagues, and between teachers and principals, with a reliability coefficient of α = .83 (Čamber Tambolaš, et al., 2023).

The School Culture Survey Questionnaire, developed by Gruenert and Valentine (1998), was adopted by Ismail, et al. (2022) to evaluate government school effectiveness in the Maldives through six dimensions, including collaborative leadership, teacher collaboration, professional development, unity of purpose, collegial support, and learning partnership. Collaborative leadership dimension reflects how effectively school leaders foster cooperative relationships with staff, while teacher collaboration reflects the extent of educators' engagement in constructive dialogue to support school goals. The professional development aspect characterizes teacher's commitment to personal and institutional growth, unity of purpose describes the alignment of teachers towards shared objectives, collegial support assesses the quality of collaboration among teachers, and learning partnership captures the joint efforts of educators, parents, and students to enhance learning outcomes (Gruenert, 1998; Ismail, et al., 2022; Tuściak, et al., 2017).

The Organisational Culture Scale, created by Şahin (2011a), was employed to assess teachers' perception of school culture, comprising 37 items across five categories: teaching culture, development culture, teacher cooperation, school leadership, and collegiality (personal support). This scale demonstrated high reliability, with a Cronbach's Alpha of .97 (Bozkurt, et al., 2021).

Similarly, the five-point Likert scale School Culture Inventory by Eger and Jakubíková (2001) was used to explore school culture in Czech primary schools. It includes five dimensions and sixteen items, including Leadership and Management (comprising shared objectives, trust in school leadership, the managerial approach, and task management and control), School Environment (comprising working conditions, organizational structure and delegation, and the aesthetic environment and cleanliness), Communication (comprising teacher motivation, information exchange, and communication with parents and stakeholders), Relationships within the School (comprising supportive leadership style, relationships and teacher collaboration, and teacher-pupil relationships), and the fifth dimension pertains to innovation and educational outcomes. The developed inventory showed strong reliability, with a Cronbach's Alpha of .88 (Eger & Egerová, 2022; Eger & Prášilová, 2020).

Simsek (2003) also created a 5-point Likert scale School Culture Scale (SCS) to assess school culture based on teachers' perception. It comprises 35 items and 13 sub-dimensions, demonstrating a high reliability value of 0.96 (Kalkan, et al., 2020). Subsequently, Ozgenel (2020) utilized SCS by Terzi (2005) to assess teachers' perception of school culture. It includes

four sub-dimensions and 29 items, like support culture, which emphasizes trust-based cooperation, honest and open communication; success culture, which focuses on completion of organizational goals; bureaucratic culture, which emphasizes adherence to rules and regulations; and mission culture, which prioritizes collective institutional objectives over personal interests. This SCS scale had a Cronbach's Alpha value of the scale 0.904 (Ozgenel, 2020).

Structural Perspective Questionnaire

The Scale of the State of School Culture measures the structural dimensions of school culture, comprising 10 items and two sub-themes, including organization of educational work (with six items) and spatial and temporal dimensions (with four items). The scale covered four aspects, including organization of space, time, teaching materials, and teaching strategies, showing a reliable value with Cronbach's alpha score of 0.70 (Čamber Tambolaš, et al., 2023).

Questionnaire to Identify the Type of School Culture

The Organizational Culture Assessment Instrument (OCAI), developed by Cameron & Quinn in 2006, based on the Competing Values Framework, investigated the different organizational cultures present in the Indian secondary schools from the teachers' perspective. The OCAI measures four culture types, including clan, adhocracy, market, and hierarchy culture, across six dimensions, i.e., dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphasis, and criteria for success (Maher, 2000; Berkemeyer, et al., 2015; Chennatuserry, et al., 2022). The dominant characteristics dimension define environmental

and atmospheric qualities present in secondary schools, organizational leadership identifies the prevalent leadership styles and approaches, management of employees explores teacher's participation in a significant conversation, collaborative decision-making, and consensus on important decisions, organizational glue relates to strategies that fostered a belongingness feeling, strategic emphasis highlights the school's long-term focus on human resource development to achieve growth, innovation, stability, and competitiveness; and criteria for success identifies the methods for rewarding teachers (Chennatuserry, et al., 2022).

3. Dimensions of the school culture promoting innovation

Among the 17 studies included in this review, seven studies demonstrated the dimensions of school culture that foster innovation in schools.

Individual Personality

The teacher's attitude towards change reflecting the adaptability of a teacher to apply new knowledge from learning programmes, which may not directly mirror the core values, but can influence the behaviour significantly (McChesney & Cross, 2023). The accepting failure dimension further aids in fostering a culture of risk-taking, encouraging innovations among teachers and students (Waters & Orange, 2022). Notably, professional values and emphasis on learning were found to be not having have a significant impact on professional learning communities (Jafar, et al., 2022). While professional values relate to teachers' commitment to effective pedagogy and positive attitude, emphasis on learning highlights the school's role as a learning hub for all (Jafar, et al., 2022). In summary, personal traits like teachers' attitude towards change, accepting failure, and risk-taking push innovation within

school culture, whereas professional values and a general focus on learning do not directly influence teachers' professional learning (McChesney & Cross, 2023; Waters & Orange, 2022).

Social Relations

From a social relations perspective, culture defines the collective way of life within a group, including shared knowledge, rules, values, and behaviour. Within schools, culture is shaped by interactions among living things, i.e., educators, students, and the wider community (Čamber Tambolaš, et al., 2023). The culture's social dimension is reflected in the relationship among teachers, the relationship between teachers and professional associates, and the relationship between teachers and principals (Čamber Tambolaš, et al., 2023). The dimensions associated with staff dynamics (the relationship between staff) play a crucial role in influencing individual behaviour and implementing the newly acquired knowledge in classrooms (McChesney & Cross, 2023). As such, a positive school culture can be nurtured through teacher autonomy, clear communication, team building, and shared goals. In contrast, factors like teacher isolation, inconsistent ethical values, and unclear administrative expectations can hinder cultural development (Ozer & Popp, 2022). There is a strong link between Continuous Professional Development and a positive school culture. However, elements like collegiality, defining mutual support and interaction among educators and collaboration, referring to a culture of solidarity, respect, and expert guidance within the school, were found to be not having a significant influence on professional learning community. Overall, the social relations theme comprising staff dynamics, teacher autonomy, clear communication, team building, and common goals, supports the development of a positive school

culture closely tied to Continuous Professional Development (McChesney & Cross, 2023; Ozer & Popp, 2022), although collegiality and collaboration appear to have limited direct impact on the professional learning community (Jafar, et al., 2022).

Leadership

The attribute transformational leadership defines the ability to inspire and motivate others through strong interpersonal relationships, guiding them toward shared goals, visions, values, and purposes (Jafar, et al., 2022). Among various domains of school culture, only two – transformational leadership and shared planning – reflect collaboration among teachers to formulate and advance a unified vision that strengthens school programmes. They significantly influence the development of a Professional Learning Community (PLC) (Jafar, et al., 2022). This finding aligns well with (McChesney & Cross, 2023), who emphasized that leadership engagement/actions within school culture significantly affect how teachers implement their professional learning in classrooms.

Innovative teachers embody transformational leadership through four key categories, including attention to others (means sharing knowledge, offering support, and encouraging peers), initiating a change (means identifying needed actions and motivating others to participate in meaningful transformation), community building (means fostering a strong learning community), and learning and developing (means engaging with various projects and using them as opportunities for innovation) (Jakavonytė-Staškuvienė & Barkauskienė, 2023).

Overall, transformational leadership and shared planning are critical components of school culture that positively influence the members by professional learning community such

as teachers. These leadership elements foster collaboration, innovation, and shared purpose, thereby enhancing the effectiveness of professional learning and its classroom implementation.

Discussion

Theoretical frameworks to measure the school culture promoting innovation

The social constructivism theory was used to explore innovative organizational culture from the perspective of award-winning teachers (Jakavonytė-Staškuvienė & Barkauskienė, 2023). This theory centrally considers the importance of language, culture, and social context in cognitive development. Lev Vygotsky, the pioneer of this theory, emphasized the role of the social environment in learning, proposing that social interaction is integral to cognitive growth (C. H. Liu & Matthews, 2005; Kalina & Powell, 2009). According to this perspective, learners acquire knowledge through engagement with their learning environment, building on their prior experiences (C. H. Liu & Matthews, 2005), suggesting that learning is context-bound and situation-specific (Buckman, et al., 2021).

Moreover, social interaction and culturally normative activities play a significant role in the psychological development of the individual (Buckman, et al., 2021). Many studies have explored how sociocultural factors influence personal and professional development, as well as cognitive growth (Devi & Madhumathi, 2021; Kalina & Powell, 2009; C. H. Liu & Matthews, 2005; Adams, 2006; Demiral, 2018; Erciyes, 2020).

While classical organizational theory focuses on structure and economic benefits, often overlooking employee autonomy and workplace culture, Taylor's approach systematizes employees as parts of machinery, disregarding social factors that influence motivation. Bronfenbrenner's Ecological Systems Theory provides a

framework for understanding how broader social contexts impact human development (Eriksson, et al., 2018; Hayes, et al., 2022; Panopoulos & Drossi-Nou-Korea, 2020; Tudge, et al., 2009). The theory evolved in three phases, where initially (1973-1979) it focused on human development from an ecological perspective, emphasizing the relationship between individuals and their environment. Subsequently, in the second phase (1980-1993), the attention shifted to highlight individual characteristics and their interaction with the environment, resulting in the bio-ecological model; and in the third phase (1993-2006), the Process–Person–Context–Time (PPCT) model was introduced, defining human development as the interaction of dynamic human processes with their environments over time. According to this theory, ecological systems influence people's learning and behaviour by taking into account their traits, families, educational institutions, and other environmental layers that they were exposed to or grew up in (Kruger & Cojocar, 2022). Many researchers have used this theory in the education field (Mehmood, et al., 2023; Panahandehpour, et al., 2023; Panopoulos & Drossi-Nou-Korea, 2020) to study how to create a positive school climate, the components of curricula, and how intervention programmes are helpful for intellectual disability students.

Innovation and creativity are closely related to learning and knowledge (Ferrari, et al., 2009). Organizational innovation is linked to the learning component of organizational culture (McCharen, et al., 2011). The adoption of more innovative teaching strategies is made possible by schools with greater organizational learning support (Silins, et al., 2002). Various organizational types and learning patterns act as mediators between organizations' innovative capabilities (Lam & others, 1998). Therefore, these theories would be taken as the lens to study how the learning aspect of school culture plays a significant role in

shaping teachers to make innovations in their field.

The tools and dimensions of the school culture promoting innovation

An individual's personality includes a teacher's attitude towards change, accepting failure, and risk-taking. They influence individual behaviour in every aspect and continuously encourage teachers to promote innovations in school culture (McChesney & Cross, 2023; Waters & Orange, 2022). This finding was reinforced by Cankar, et al., 2012, they reported that teachers play the most important role in promoting innovation in schools and that their personality traits play a crucial role in producing new ideas (Liu, et al., 2024). Risk-taking is the foundation of creativity and innovation (Cankar, et al., 2012; Ferrari, et al., 2009; Fuad, et al., 2022). Liu, et al. (2024) state that when teachers perceive and their works are acknowledged, they become more receptive to new ideas and more willing to take risks when implementing teaching strategies. Teachers' professional learning was unaffected by their professional values or emphasis on learning (Jafar, et al., 2022). However, both professional and informal learning encourage teachers, etc., to explore novel teaching strategies and pinpoint areas for improving their teaching methods (Liu, S., et al., 2024).

The social relations theme includes staff dynamics, teacher autonomy, clear communication, team building, and common goals which help in creating a positive school culture that has a strong interrelationship with CPD (McChesney & Cross, 2023; Ozer & Popp, 2022) and the two elements of the school culture, collegiality and collaboration, did not significantly influence the Professional Learning Community. Connecting the ongoing learning process with supportive environmental factors encourages dynamic knowledge production and organizational innovation (McCharen, et al., 2011). A school system that promotes lifelong

learning inspires teachers to be more innovative and creative (McCharen, et al., 2011). The creation of professional learning communities in schools helped teachers communicate, engage in reflective dialogue, and be exposed to a variety of viewpoints – all of which are essential for teacher innovation (Liu, et al., 2024). Autonomy fosters a sense of responsibility in a person and provides great freedom to define their role (McCharen, et al., 2011). Teachers' autonomy and clear communication encourage creativity and innovation in school (Cankar, et al., 2012). This is in line with the Fuad, et al. (2022) study, which observed that active interaction with universities and the government enhances innovation, and Lin (2022) revealed that teachers' autonomy motivates teachers' innovativeness. A favourable atmosphere for teacher innovation is facilitated by good communication, trust-building, and knowledge-sharing among colleagues through cooperation (Liu, et al., 2024). Researchers adapted the Revised School Culture Element Questionnaire (RSCEQ), which was developed by Olivier, to measure the professional behaviour of teachers in schools. Olivier refined the original School Culture Element Questionnaire (which has eight dimensions and 54 items), resulting in a 20-item RSCEQ used to assess professional school culture (DeVaney, et al., 2012; Olivier, 2001). This instrument is used to test teachers' perceptions of "who we are" and "what we do around here," as well as the principles and standards of a school culture that represent professional behaviour in schools (Olivier, 2001).

Though collegiality and collaboration did not significantly influence the PLC, in a few studies or numerous other studies emphasize the crucial role of collaboration in fostering innovation within school culture. For instance, collaboration has been shown to lead to more innovative solutions to problems (Fuad, et al., 2022; Hindin, et al., 2007), thereby promoting a culture of innovation in schools (Cankar,

et al., 2012). Additionally, teachers' collaborative networks have been found to enhance teacher innovativeness (Xafakos, et al., 2020). School improvement initiatives often rely on system-level reforms that are built on collaboration and networking across schools and districts (Hopkins, et al., 2014).

Moreover, teachers' social competencies allow them to effectively participate in professional learning communities (PLCs), facilitating the active exchange of ideas with colleagues and students, which in turn drives innovation (Liu, S., et al., 2024). A collegial relationship can significantly contribute to the success of innovative goals, and teamwork is identified as a key factor supporting innovation in educational settings (Hagstrom, 2023). A human relations centred school culture has been effective in fostering innovation (Ferencová, et al., 2019). Supporting this perspective, Martins & Martins (2002) concluded that a trust-based relationship plays a pivotal role in nurturing creativity and innovation within an organizational culture. To evaluate the collaborative dimension of school culture in innovative schools, researchers are encouraged to use the School Culture Scale (SCS) developed by Gruenert and Valentine in 1998. This tool is specifically designed to assess the collaborative nature of school environments and has been widely adopted across various countries for this purpose (Gumuseli & Eryilmaz, 2011; Tuściak, et al., 2017). The SCS remains one of the most popular instruments for gauging how collaborative teachers are working within a school setting.

Attributes such as transformational leadership and sharing planning significantly impact the implementation of teacher learning in classrooms. Several studies (Fuad, et al., 2022; Hallinger, 2003; Harris, 2002; Hopkins, et al., 2014; Liu, et al., 2024; Nebieridze, 2023; Vennebo, 2015) highlight leadership as a critical factor in driving educational innovation and school improvement. The background, history,

and culture of a school influence the extent to which it evolves into a creative and effective institution (Nebieridze, 2023). At the same time, a principal's life experiences, expertise, and insights shape her/his leadership style, equipping her/him to foster innovation and effectiveness. The attribute transformational leadership is particularly influential as it enhances the organization's capacity for innovative change (Hallinger, 2003), supports student achievement through cultural transformation (Hopkins, et al., 2014), and plays a vital role in school improvement (Harris, 2002). This form of leadership encourages teachers to think creatively, take calculated risks, and pursue intellectual growth, all of which are essential for cultivating an innovative school culture (Liu, S., et al., 2024). Furthermore, the practices of sharing and learning from others can broaden perspectives and introduce new opportunities (Richardson, 2021). Leaders who engage in shared learning not only reflect critically on their own visions but also become better equipped to articulate those visions and foster a dynamic learning community. Although leaders have a significant impact on shaping school culture and driving innovation, their influence has its limitations (Richardson, 2021). Nevertheless, leadership remains a crucial driver of educational innovation. To evaluate leadership effectiveness and cultural alignment, researchers may apply the School Culture Inventory developed by Eger and Jakubíková (2001). This tool helps identify the cultural gap between a school's intended culture and its current state (Eger & Prášilová, 2020). Understanding these cultural gaps is vital for school leaders striving to cultivate a positive school climate and culture.

Researchers can adapt Cavanaugh's School Cultural Elements Questionnaire (SCEQ), developed in 1997, which has proven effective in evaluating both dominant and desired school culture (Cavanaugh, 1997b; DeVaney, et al., 2012). This instrument uniquely measures

perceptions by distinguishing between the actual and preferred states of school culture. As such, respondents are asked to describe how things currently function in their school (actual) and how they would ideally like them to function (preferred) (DeVaney, et al., 2012). Originally designed to assess teachers' perspectives in Western Australian schools (Olivier, 2001), the instrument remains relevant for broader educational contexts. Moreover, the Organizational Culture Assessment Instrument (OCAI) offers a framework to evaluate current organizational culture and predict performance trends. This instrument, widely employed across sectors, enables institutions to identify existing value patterns and project the desired cultural orientation for strategic change (Maher, 2000; Berkemeyer, et al., 2015). Berkemeyer, et al. (2015) emphasized that schools, as organizations committed to societal educational roles and individual student development, can be evaluated similarly to other organizational structures. OCAI has been effectively applied to assess the cultural perceptions of both teachers (Berkemeyer, et al., 2015) and students (Caliskan & Zhu, 2019; Steinhoff & Owens, 1989), demonstrating its versatility and relevance in educational settings.

Conclusion

This systematic review examined the key theories that explain how the learning components of school culture foster teacher innovation. It explored various dimensions of school culture and identified several instruments for evaluating aspects that contribute to fostering innovation. The review also provides an overview of the quantitative methods used to assess school culture and critically analyses how these cultural elements support innovation in educational environments. It has also seen studies on foundational theories such as 'Social Constructivism Theory' and 'Bronfenbrenner's Ecology Theory,' to understand the impact of school culture on

teachers' professional innovation. Although the review utilized a single database, it identified several standardized instruments designed to measure the multifaceted nature of school culture and its relationship to innovation. Despite the growing scholarly interest in this relationship, the findings emphasize the need for more comprehensive and cross-disciplinary research that incorporates diverse databases, additional theoretical models, and robust methodological approaches. This review revealed that both organizational social

dynamics and individual-level cultural factors play crucial roles in encouraging innovation among educators. However, deeper investigation into the structural and contextual variables that shape these factors is still an open area. Overall, this review offers a valuable synthesis of the existing literature and serves as a foundation for future inquiry. The findings of the study echo for continued academic attention and collaboration to better understand and enhance the role of school culture in fostering educational innovation.

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