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Impact of Educational Portfolios in Teacher Collaborative Professional Development

Marlon L. Lalaguna
Department of Education

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*Corresponding Author:
marlon.lalaguna@deped.gov.ph

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ABSTRACT

The study examines the perceived value of educational portfolio development in the collaboration practice of in-service teachers, specifically in the four Collaborative Learning Processes (CPL): mentoring and coaching, peer critiquing, sharing of best practices and resources, and problem-solving. The respondents were 40 junior high school teachers of General Tiburcio de Leon National High School, Division of Valenzuela City. To provide both quantitative and qualitative descriptions of how the educational portfolio could facilitate CPL among the in-service teachers and positively impact their professional development, the researcher used the explanatory design of the mixed method. The respondents used three sets of questionnaires prior to the online portfolio development workshop (Paper-Based Portfolio Development Readiness Survey, Online Portfolio Development Readiness Survey, and the Perceived Value of Teaching Portfolio on Collaborative Professional Learning Experiences). After the online portfolio development iii iv and practice for the School Year 2019-2020, the participants responded to the same Perceived Value of Teaching Portfolio on Collaborative Professional Learning Experiences. The researcher also conducted a focus group discussion (FGD) to gather participants' perceptions of the impact of educational portfolios in their collaboration practice. The findings of this study imply that an online portfolio has greater perceived value than a paper-based portfolio when it comes to facilitating collaboration among the teachers through mentoring and coaching, sharing of best practices and resources, peer critiquing, and problem-solving.

Keywords: Collaboration Practice Professional Development Teaching Portfolio

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Introduction

The teaching profession has become increasingly challenging due to the rapid changes taking place in education and society. Teachers are expected to adapt to technological advancements, continuing curriculum and assessment reforms, classroom management concerns, increasing demands for quality teaching and learning, and the emergence of innovative teaching strategies designed to address the needs of 21st-century learners (Kariuki, 2009; Liu, 2012). These demands became even more evident during the COVID-19 pandemic, when teachers had to become resourceful and innovative in developing self-learning modules, learning new technologies, and adjusting to different teaching modalities. Schools were required to implement learning continuity plans to ensure that education remained accessible through blended and distance learning approaches for millions of Filipino learners (Department of Education, 2021). Such developments created another significant shift in the educational system and expanded the responsibilities of teachers beyond traditional classroom instruction. Consequently, teachers are continuously encouraged to participate in professional development activities that strengthen their knowledge, skills, and competencies. Professional development has therefore become an important means of helping teachers respond effectively to educational changes, improve their teaching practices, and remain capable of addressing the diverse and changing needs of their learners.

The importance of continuous professional growth is further emphasized by the institutionalization of Continuing Professional Development among licensed professionals in the Philippines. Teachers are expected to continuously improve their professional knowledge and competencies so that they can remain relevant and effective in their profession. Llagas, Corpuz, and Bilbao (2018) emphasized that teachers should embrace continuing professional development to improve their classroom practices and provide better guidance to their learners. In the same manner, educational leaders and teacher education institutions have an important responsibility to create opportunities that support the professional growth of teachers. As Barber and Mourshed (2007) emphasized, the quality of an educational system is strongly influenced by the quality of its teachers. Supporting teachers' continuing education, training, and professional learning is therefore closely connected with the Department of Education's commitment to providing quality education to Filipino learners. Professional development may include short-term and long-term training, graduate education, conferences, seminars, workshops, professional learning communities, and informal learning opportunities situated within actual practice (Speck & Knipe, 2005). These activities provide teachers with opportunities to strengthen their content knowledge, communication skills, pedagogical practices, and overall professional competence (Daitol, 2011). In a continuously changing educational environment, professional development is not simply an additional responsibility but an essential part of maintaining effective and responsive teaching practices.

Despite the importance of professional development, traditional approaches such as seminars, workshops, and formal training may not always adequately address the growing and diverse professional needs of teachers (Pan, 2011). This situation highlights the need for alternative and more flexible platforms that allow teachers to learn continuously and collaboratively. Teacher collaboration has been recognized as an effective professional development strategy because it provides opportunities for educators to exchange ideas, share experiences, discuss classroom concerns, and learn effective practices from one another. Previous studies have associated teacher collaboration with improvements in instructional practices, classroom management, and student achievement (Gomez, 2016; Matranga, 2017; Ronfeldt et al., 2015). However, collaboration may be limited by conflicting teaching schedules, workload, distance, and the physical location of teachers (Seo & Han, 2013). Advances in Information and Communications Technology provide opportunities to overcome these limitations by allowing professional interaction beyond traditional boundaries of time and place. Digital platforms can support collaboration, collegiality, mentoring, sharing of resources, and exchange of best practices among teachers (Bokiev et al., 2017). Studies involving Personal Learning Networks, social media, blogs, and other online platforms further indicate that technology can contribute to teachers' professional development through knowledge sharing, collaboration, coaching, and mentoring (Caprino, 2015; Francis & Jacobsen, 2013; Seo & Han, 2013; Hoffman, 2017; Larson, 2016; Meredith, 2018; Scurr, 2017). Thus, technology provides an opportunity to transform professional development from an occasional formal activity into a more continuous, accessible, and collaborative learning process.

Within this context, the present study explores the potential of the educational portfolio as a tool for teachers' professional development and collaboration, particularly by comparing traditional paper-based portfolios with online-based portfolios. An educational or teaching portfolio contains significant artifacts that demonstrate a

teacher's professional practices, accomplishments, competencies, and current stage of career development. These artifacts may include lesson plans, assessment tools, certificates, student outputs, transcripts, instructional innovations, research outputs, and other evidence of professional practice (Alstad-Davies, 2021). While paper-based portfolios traditionally organize these documents in physical folders or ring binders, online portfolios provide teachers with opportunities to organize and present professional evidence using electronic documents, images, photographs, videos, audio materials, and hyperlinks. Both formats can serve as meaningful representations of teachers' professional accomplishments; however, online portfolios may provide additional opportunities for accessibility, organization, reflection, sharing, and professional collaboration. In this study, teachers develop portfolios aligned with their performance assessment and key result areas under the Results-Based Performance Management System (RPMS) and the Philippine Professional Standards for Teachers (PPST). The RPMS provides a mechanism for ensuring that employees' work and performance contribute to the vision, mission, values, and strategic priorities of the Department of Education toward delivering quality educational services to Filipino learners (DepEd Order No. 2, s. 2015). By examining paper-based and online-based educational portfolios, the study seeks to determine how portfolio development can contribute to teachers' reflection, collaboration, documentation of professional growth, and continuing professional development within the changing educational environment.

Methods

This study investigated how paper-based and online teaching portfolios facilitate collaborative professional learning experiences and contribute to the professional development of in-service teachers. Using an explanatory mixed-method research design, the study involved 40 purposively selected teachers from different learning areas at General Tiburcio de Leon National High School in Valenzuela City, with participants representing different teaching positions and possessing basic computer skills. Quantitative data were collected through Likert-scale questionnaires measuring portfolio development readiness and the perceived value of paper-based and online portfolios in supporting mentoring and coaching, peer critiquing, sharing of best practices and resources, and collaborative problem-solving, while individual and focus-group interviews were conducted to provide deeper explanations of the teachers' experiences and perceptions. The participants underwent an online portfolio development intervention using Blogger, where they developed portfolios based on the Philippine Professional Standards for Teachers (PPST), followed by post-assessment and interviews; the quantitative data were analyzed using weighted arithmetic mean, standard deviation, frequencies and percentages, and a t-test for correlated means to determine differences between pretest and posttest results. Overall, the study examined whether transitioning from traditional paper-based portfolios to online portfolios could strengthen teachers' professional development by providing greater opportunities for collaboration, professional reflection, sharing of practices and resources, mentoring, peer feedback, and collaborative problem-solving, thereby presenting the online portfolio as a potential platform for continuous and collaborative professional learning among teachers.

Results and Discussions

Teachers' Readiness for Paper-Based and Online Portfolio Development

The findings revealed that the teachers were generally ready to develop both paper-based and online portfolios. For paper-based portfolio development, the participants showed positive readiness in goal setting, completing tasks, persistence, collaboration, organization of portfolio artifacts, and use of basic computer and printing facilities. All participants obtained overall scores within the 3.00–4.00 range, indicating favorable readiness. However, relatively lower responses were noted for installing and configuring software, availability of reliable computer applications, and access to binding services. Only 70% reported access to soft or ring-binding services, suggesting that material and logistical resources remained a concern.

Similarly, teachers demonstrated a high level of readiness for online portfolio development. All participants obtained overall scores within the 3.00–4.00 range. They demonstrated positive attitudes toward goal setting, persistence, independent and collaborative learning, computer use, Internet browsing, file searching, and online communication. Nevertheless, some technical limitations were observed. While 90% reported access to a fairly fast and reliable Internet connection, 87.50% indicated that they were comfortable installing software and modifying computer settings. These findings indicate that teachers possessed the fundamental competencies needed for online portfolio development, although Internet access and more advanced technical skills remained areas for improvement.

Table 1

Summary of Teachers' Readiness for Paper-Based and Online Portfolio Development

Readiness Indicator	Paper-Based Portfolio	Online Portfolio
Overall score range	3.00–4.00	3.00–4.00
Goal setting and deadlines	100.00% positive	100.00% positive
Completing projects/tasks	100.00% positive	100.00% positive
Collaboration/communication	100.00% positive	97.50% positive
Basic computer-related competency	Generally positive	100.00% positive
Software installation/configuration	85.00% positive	87.50% positive
Reliable computer/system	92.50% positive	92.50% positive
Internet connection	Not a primary requirement	90.00% positive
Binding/material accessibility	70.00% for binding services	Not applicable
Overall interpretation	Ready	Ready

Note. Positive responses combine *Agree* and *Somewhat Agree*.

The findings showed a considerable difference between teachers' perceptions of paper-based and online portfolios in supporting collaborative professional learning (CPL). For the paper-based portfolio, positive and negative responses were almost equally distributed. There were 277 (49.46%) positive responses and 283 (50.54%) negative responses. Among the four CPL processes, mentoring and coaching obtained the highest mean ($M = 2.48$, $SD = 0.65$), followed by collaborative problem solving ($M = 2.29$, $SD = 0.74$), peer critiquing ($M = 2.21$, $SD = 0.79$), and sharing of best practices ($M = 2.15$, $SD = 0.88$). This indicates that paper-based portfolios contributed to professional learning, particularly through interaction with instructional supervisors, but were relatively limited in facilitating broader collaboration among teachers.

In contrast, teachers demonstrated consistently positive perceptions after implementing the online portfolio. All responses were either *Agree* or *Strongly Agree*, consisting of 356 (63.57%) strongly agree and 204 (36.43%) agree responses. Sharing of best practices obtained the highest mean ($M = 3.71$, $SD = 0.43$), followed by peer critiquing ($M = 3.66$, $SD = 0.44$), collaborative problem solving ($M = 3.65$, $SD = 0.42$), and mentoring and coaching ($M = 3.55$, $SD = 0.39$). All 40 participants positively perceived the online portfolio, with 29 (72.50%) obtaining average scores between 3.50 and 4.00. The results suggest that the online environment expanded opportunities for teachers to exchange resources, provide feedback, seek assistance, and communicate professionally.

Table 2

Perceived Value of Paper-Based and Online Portfolios in Collaborative Professional Learning

Collaborative Professional Learning Process	Paper-Based M	SD	Online M	SD
Mentoring and Coaching	2.48	0.65	3.55	0.39
Peer Critiquing	2.21	0.79	3.66	0.44
Sharing of Best Practices	2.15	0.88	3.71	0.43
Collaborative Problem Solving	2.29	0.74	3.65	0.42

Note. Higher mean scores indicate a more positive perceived value of the portfolio in supporting collaborative professional learning.

The results clearly show increases across all four dimensions after online portfolio implementation. The largest descriptive increase was observed in sharing of best practices, from 2.15 to 3.71, followed by peer critiquing, from 2.21 to 3.66. These results suggest that the accessibility and shareability of online portfolios made it easier for teachers to view instructional materials, exchange ideas, provide feedback, and learn from the professional practices of their colleagues.

Significant Difference Between Paper-Based and Online Portfolios

A paired-samples t-test was used to determine whether the differences between teachers' perceptions of paper-based and online portfolios were statistically significant. Significant differences were found across all four CPL processes.

Table 3

Paired-Samples t-Test Comparing Paper-Based and Online Portfolios

CPL Process	Paper-Based M (SD)	Online M (SD)	t-value	p-value	Interpretation
Mentoring and Coaching	2.48 (0.65)	3.55 (0.39)	-9.21	< .00001	Significant
Peer Critiquing	2.21 (0.79)	3.66 (0.44)	-11.45	< .00001	Significant
Sharing of Best Practices	2.15 (0.88)	3.71 (0.43)	-10.94	< .00001	Significant
Collaborative Problem Solving	2.29 (0.74)	3.65 (0.42)	-10.04	< .00001	Significant

Note. Differences are statistically significant at $p < .05$.

The results indicate statistically significant differences between paper-based and online portfolio practices across all four CPL processes. Mentoring and coaching significantly increased from $M = 2.48$ to $M = 3.55$ ($t = -9.21$, $p < .00001$). Peer critiquing increased from $M = 2.21$ to $M = 3.66$ ($t = -11.45$, $p < .00001$), while sharing of best practices increased from $M = 2.15$ to $M = 3.71$ ($t = -10.94$, $p < .00001$). Collaborative problem solving likewise increased from $M = 2.29$ to $M = 3.65$ ($t = -10.04$, $p < .00001$). Thus, the findings indicate that participants perceived the online portfolio as more valuable than the traditional paper-based portfolio in supporting collaborative professional learning.

Challenges in Paper-Based and Online Portfolio Development

The qualitative findings provided further explanation for the quantitative results. In paper-based portfolio development, the most frequently identified challenge was technicality and quality assurance support, with 18 mentions (38.30%). This was followed by demand for time with 13 mentions (27.66%), collection and organization of Means of Verification (MOVs) with 12 mentions (25.53%), and lack of resources such as paper, ink, and other materials with four mentions (8.51%).

Online portfolio development presented a somewhat different set of difficulties. Technicality remained the most frequently identified challenge with 18 mentions (33.96%), particularly in using Blogger, linking files, uploading materials, archiving evidence, and customizing the online portfolio. Internet access ranked second with 17 mentions (32.08%), followed by demand for time with 11 mentions (20.75%), MOV collection with five mentions (9.43%), and privacy issues and administrative support with one mention each (1.89%).

Table 4

Challenges Encountered in Paper-Based and Online Portfolio Development

Paper-Based Portfolio Challenges	f	%	Online Portfolio Challenges	f	%
Technicality/Quality Assurance and ICT Concerns	18	38.30	Technicality of Online Portfolio Development	18	33.96
Demand for Time	13	27.66	Internet Access	17	32.08
MOV Collection and Organization	12	25.53	Demand for Time	11	20.75
Lack of Resources and Materials	4	8.51	MOV Collection	5	9.43
—	—	—	Privacy Issues	1	1.89
—	—	—	Administrative Support	1	1.89

The results demonstrate that technical concerns were common to both portfolio formats. However, online portfolio development introduced additional challenges involving Internet connectivity and digital skills. Despite these difficulties, collaboration became an important mechanism for overcoming technical problems. Participants reported seeking assistance from LAC leaders, Master Teachers, ICT-skilled teachers, and colleagues. Thus, technical difficulties also created opportunities for mentoring, peer assistance, and collaborative problem solving.

Professional Learning Experiences Through Portfolio Development

The professional learning experiences associated with paper-based and online portfolios also differed. Paper-based portfolio development was predominantly associated with individual professional realization and growth, accounting for 48.78% of the coded responses. Mentoring and coaching followed at 36.59%, while sharing of best practices, peer critiquing, and collaborative problem solving were less frequently identified.

In comparison, online portfolio development was primarily associated with sharing of best practices and instructional materials, representing 45.65% of responses. Mentoring and coaching accounted for 26.09%, collaborative problem solving for 17.39%, and peer critiquing for 10.87%. These findings indicate a shift from predominantly individual professional learning under the paper-based format toward more collaborative learning under the online portfolio.

Table 5

Professional Learning Experiences Through Paper-Based and Online Portfolios

CPL Experience	Paper-Based f (%)	Online f (%)
Mentoring and Coaching	15 (36.59%)	12 (26.09%)
Sharing of Best Practices and Instructional Materials	4 (9.76%)	21 (45.65%)
Peer Critiquing	2 (4.76%)	5 (10.87%)
Collaborative Problem Solving	1 (2.38%)	8 (17.39%)
Individual Professional Realization and Growth	20 (48.78%)	—

The paper-based portfolio was useful for documenting accomplishments, identifying strengths and weaknesses, organizing evidence, and reflecting on professional progress. However, its benefits were primarily personal and individual. The online portfolio, meanwhile, provided a more interactive environment where teachers could share lesson exemplars and instructional materials, obtain feedback, receive mentoring, and collectively solve instructional and technical concerns. The online format therefore broadened the portfolio's role from documentation toward active professional knowledge sharing.

Impact on Teachers' Collaborative Professional Learning

The thematic analysis further demonstrated contrasting impacts of the two portfolio formats. For the paper-based portfolio, the most prominent theme was individual and competitive effort for professional development, with 19 mentions (35.19%). Increased collaboration through LAC sessions ranked second with 15 mentions (27.78%), followed by effective communication of career progress with instructional supervisors with 11 mentions (20.37%). Other themes included enhanced self-expression, development of evidence collection and organization skills, and resourcefulness.

For the online portfolio, increased professional discussion was the dominant theme, with 22 mentions (30.99%), followed by ubiquitous collaborative professional learning with 20 mentions (28.17%). Other themes included collegiality and camaraderie (14.08%), enhanced self-confidence and self-expression (12.68%), environmental and time/cost benefits (7.04%), and suitability for the new normal (7.04%).

Table 6

Impact of Paper-Based and Online Portfolios on Teachers' Professional and Collaborative Learning

Paper-Based Portfolio Themes	f	%	Online Portfolio Themes	f	%
Individual and Competitive Professional Effort	19	35.19	Increased Professional Discussions	22	30.99
Collaboration through LAC Sessions	15	27.78	Ubiquitous Collaborative Professional Learning	20	28.17
Communication of Career Progress to Supervisors	11	20.37	Collegiality and Camaraderie	10	14.08
Enhanced Self-Expression	4	7.41	Enhanced Self-Confidence and Self-Expression	9	12.68
Evidence Collection and Organization Skills	3	5.55	Environment Friendly, Time and Cost-Effective	5	7.04
Resourcefulness	2	3.70	Suitability for the New Normal	5	7.04
Total	54	100.00	Total	71	100.00

The qualitative findings reinforce the statistical results by showing that the two portfolio formats served

different professional functions. Paper-based portfolios were primarily associated with individual accomplishment, performance documentation, career monitoring, and scheduled collaboration during LAC sessions. Some teachers even perceived paper-based portfolio preparation as competitive because portfolios were closely connected with individual performance ratings. In contrast, online portfolios increased opportunities for continuous professional interaction. Teachers could share instructional resources, communicate with colleagues, seek advice, provide constructive feedback, and address problems without being limited by the schedule or physical location of formal LAC sessions.

The accessibility of online portfolios also supported what emerged from the qualitative findings as ubiquitous collaborative professional learning. Participants emphasized their ability to access portfolios and interact with colleagues anytime and anywhere. This increased the frequency of professional discussions and created opportunities for teachers from different learning areas to exchange knowledge. Furthermore, the online environment encouraged collegiality and camaraderie because teachers frequently assisted one another with technical and instructional concerns. Some participants who were less confident during face-to-face discussions also reported becoming more comfortable expressing their ideas through the online platform.

Hence, the integration of quantitative and qualitative findings demonstrates that while both portfolio formats contributed to teachers' professional development, the online portfolio showed greater potential for strengthening collaborative professional learning. Paper-based portfolios remained valuable for documentation, reflection, organization of MOVs, communication with supervisors, and individual career development. However, online portfolios extended these functions by providing a more accessible and interactive environment for sharing best practices, mentoring and coaching, peer critiquing, and collaborative problem solving. The statistically significant increases across all four CPL processes, together with the qualitative themes of increased professional engagement, ubiquitous collaboration, collegiality, and self-expression, indicate that online portfolio development can serve not only as a mechanism for documenting teacher performance but also as a platform for sustained professional collaboration and learning.

Conclusions

It is indeed of utmost importance that the readiness of the teachers should be gauged first before they become part of educational portfolio practice, may it be in paper-based or online-based format. Teachers should possess at least basic ICT skills since the development of a paper-based portfolio involves basic graphic designing and layouting. In contrast, an online portfolio involves using a computer, the Internet, and other web technologies. However, teachers should also possess the infrastructure to support the development and maintenance of their online portfolio sites like computers with minimum specifications enough to run the browser and other multimedia applications in online portfolio development. It can also be deduced that technology skills and other technical aspects are not just the factors that should be considered in their readiness. The teachers should also have the right frame of mind and attitude toward paper-based and online portfolios. Since teachers can interact with each other in online portfolio development, it is also crucial that they are ready to learn and collaborate. Almost all the research participants were indeed prepared, meeting all the technical requirements, basic ICT skills, and positive attitude in developing their paper-based and online portfolio and collaborating online. Overall, the researcher decided to pursue the study with the same participants.

The paper-based portfolio is still considered valuable by almost half of the participants as a tool that can help facilitate collaborative professional learning experiences among them. In contrast, the other half thought the opposite. The participants perceived that paper-based was most valuable in the mentoring and coaching experience since the paper-based RPMS portfolio was used to evaluate the teacher's performance based on the collected MOVs or artifacts. However, when the participants were asked about the perceived value of the online portfolio in their collaborative professional learning experiences like mentoring and coaching, peer critiquing, sharing of best practices, and collaborative problem solving after they experienced developing and using it, they all unanimously agreed of its positive impact in their collaboration practice.

An online portfolio has a greater perceived value than a paper-based portfolio when it comes to the collaborative professional learning experiences of the participants. The virtual nature of the online portfolio, wherein the teachers can access their own and others' online portfolios and discussion forum sites anytime and anywhere, helped increase the frequency of interaction and engagement. On the other hand, after it was used for the

evaluation, the paper-based portfolio was usually kept in the owner's locker. The potential of the online portfolio to showcase the best artifacts of the teachers could be very helpful in inspiring other teachers to come up with their best practices as well. The availability of a discussion forum feature embedded in the online portfolio provided a platform for the participants to conduct all collaborative professional learning processes and discuss their RPMS online portfolio.

Though there were some challenges that the participants encountered in the development and implementation, like technicality for constructing a paper-based portfolio, which usually involves layouting, graphic designing, demand for time, and the complexity of MOV collection an organization for paper-based portfolio. In contrast, the difficulty and technicality of creating the online portfolio using the Blogger platform, Internet connection problems, other school-related tasks, and reports that compete with their time for online portfolio development never stopped the participants from exploring and enjoying the many potentials of both the paper-based and online portfolio. Compared to the paper-based portfolio, which is perceived to advance more of the individualistic and competitive approach of professional development, there were many scenarios that the online portfolio that became very helpful in enhancing their professional learning collaboratively. Most teachers perceived that the online portfolio allowed them to showcase their best teaching practices and instructional materials to other teachers and that they also enjoyed viewing other's artifacts. While mentoring and coaching learning processes were the online CPL process which was significantly evident during the paperbased portfolio development, all the other collaborative professional learning processes like mentoring and coaching, peer critiquing, and collaborative problem solving manifested through the online portfolio practice. The participants believed that through the ubiquitous nature of the online portfolio, they experienced more engagement and interaction with their fellow teachers, even beyond their time in school. A more dynamic community of practice was established through this online portfolio, with teachers that enjoy the atmosphere of collegiality and companionship as they continuously improve their teaching practice and progress in their career path with the help and support of each other. Overall, the online portfolio created a more positive impact on the collaboration practice of the participants.

Recommendations

Based on the findings and conclusions of the study, it is recommended that the Online Portfolio Development Workshop be extended to several days to provide online portfolio focal persons, LAC leaders, and teachers with sufficient time to develop the technical skills needed in creating and managing online portfolios, particularly through Blogger. School administrators are encouraged to support and institutionalize the digitization of teachers' RPMS-PPST portfolios because online portfolios can strengthen collaborative professional learning through mentoring and coaching, peer critiquing, sharing of best practices, and collaborative problem solving. Education officials responsible for teacher performance evaluation may also consider reviewing existing policies and guidelines to determine the feasibility of integrating online portfolios into the teacher appraisal system and adopting a standardized and user-friendly e-portfolio platform, such as a web portal, software, or mobile application, for wider implementation. School leaders are further encouraged to promote a culture of collaboration and collegiality by recognizing teachers who actively share knowledge, provide peer support, and contribute to professional learning beyond formal LAC sessions, seminars, workshops, and conferences. Finally, future researchers are encouraged to conduct similar studies involving larger groups of participants and expand the implementation to the school, division, or regional level to further examine the effectiveness and sustainability of online portfolios in supporting teachers' collaborative professional learning and professional development.

Conflict of Interests

The author declares that they have no conflicts of interest

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