Remittances Review
September 2024,
Volume: 9, No: S 4, pp. 2021-2042
ISSN: 2059-6588(Print) | ISSN 2059-6596(Online)

Received: 20 August 2024, Accepted: 10 September 2024

Evaluating Teacher Professional Development Interventions to Promote Youth Wellbeing and Positive Technology Use at the Higher Secondary Level

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ABSTRACT

Youth wellbeing and responsible technology use have become pressing concerns in contemporary education, particularly at the higher secondary level where adolescents experience increased academic pressure and digital exposure. Teachers play a critical role in shaping students' emotional development and technology-related behaviors; however, many educators lack professional training in wellbeing-oriented pedagogy and digital citizenship. This study aims to quantitatively evaluate the effectiveness of teacher professional development interventions in promoting youth wellbeing and positive technology use at the higher secondary level. The study adopts a cross-sectional quantitative research design and focuses on higher secondary school teachers from Punjab and Azad Jammu & Kashmir, Pakistan. Data were collected from a sample of 300 teachers using a structured questionnaire based on a five-point Likert scale. The instrument measured teacher professional development experiences, wellbeing-supportive instructional practices, promotion of positive technology use, and perceptions of youth wellbeing. Data analysis was conducted using SPSS, employing descriptive statistics, reliability analysis, correlation, and regression techniques. The findings reveal that teacher professional development interventions have a significant positive impact on youth wellbeing and the promotion of responsible technology use. Results further indicate that professionally trained teachers are more likely to implement wellbeing-supportive teaching practices and guide students toward balanced digital engagement. The findings offer valuable implications for educational policymakers, teacher training institutions, and school leadership seeking to improve youth wellbeing and responsible technology use through evidence-based professional development initiatives.

Keywords: *Teacher Professional Development, Youth Wellbeing, Positive Technology Use, Digital Citizenship, Higher Secondary Education, Pakistan*

1. INTRODUCTION

In recent years, youth wellbeing has emerged as a central concern for education systems across the globe, particularly within the context of rapid technological advancement and digital transformation. Adolescents at the higher secondary level are navigating an increasingly complex environment shaped by academic demands, social pressures, and continuous exposure to digital technologies. Smartphone, social media platforms, online learning tools, and algorithm-driven content now play a significant role in students' daily lives, influencing not only their academic performance but also their mental health, emotional stability, social relationships, and overall sense of wellbeing (Keles et al., 2020). While technology has opened new opportunities for learning, creativity, and global connectivity, its excessive or unregulated use has been associated with a range of negative outcomes, including stress, anxiety, digital addiction, cyber bullying, sleep disruption, and reduced face-to-face social interaction. As a result, educational institutions are under growing pressure to move beyond a narrow focus on academic achievement and address students' psychological wellbeing and responsible technology use as core educational priorities (Taylor et al., 2017).

Within this evolving educational landscape, teachers occupy a pivotal role in shaping students' learning environments, behaviors, and coping strategies. As frontline practitioners, teachers interact with adolescents on a daily basis and are uniquely positioned to influence how young people engage with technology both inside and outside the classroom. Teachers' model appropriate behavior, set expectations for technology use, and can guide students toward healthy digital habits (Domoff et al., 2019). However, despite this critical role, many teachers lack formal preparation in integrating digital tools in ways that actively support student wellbeing. Traditional teacher education and preparation programs have historically emphasized subject knowledge, curriculum delivery, and assessment practices, often giving limited attention to mental health promotion, socio-emotional learning, and digital wellbeing. This imbalance leaves many teachers underprepared to address the psychological and technological challenges faced by today's youth (Odgers & Jensen, 2020).

This gap in teacher preparedness underscores the growing importance of teacher professional development (TPD) interventions specifically designed to promote youth wellbeing and positive technology use. Teacher professional development encompasses structured training programs, workshops, mentoring arrangements, and continuous learning initiatives aimed at enhancing teachers' professional competencies. When aligned with wellbeing and digital citizenship goals, such interventions can equip teachers with the knowledge, skills, and attitudes required to recognize students' emotional needs, respond to signs of distress, and encourage balanced and ethical engagement with technology (Redecker, 2017). Increasingly, research suggests that teachers who receive targeted training in wellbeing-oriented pedagogy are better able to foster emotionally supportive classroom environments, promote resilience, and help students develop self-regulation skills in their digital lives (OECD, 2019).

The relevance of such interventions is particularly pronounced at the higher secondary level, a developmental stage characterized by heightened academic pressure, identity exploration, and increased autonomy in decision-making, including technology use. Students at this level often experience stress related to examinations, future career choices, and social expectations, while simultaneously gaining greater independence in their online activities (European Commission, 2020). This combination makes them especially vulnerable to the negative consequences of digital overuse, such as social comparison, online harassment, and technology-related distraction. At the same time, this stage offers significant opportunities for positive engagement with technology, including collaborative learning, critical inquiry, and skill development for the digital economy. Teachers who are trained in wellbeing-focused and technology-aware practices can play a transformative role by guiding students toward balanced digital habits, promoting critical thinking, and reinforcing ethical and responsible online behavior (UNICEF, 2021).

In the context of Pakistan, particularly in provinces such as Punjab and Azad Jammu & Kashmir (AJK), the integration of technology into education has expanded rapidly in recent years, especially following the COVID-19 pandemic. Online learning platforms, digital assessment tools, and blended learning models have become increasingly common in higher secondary education (European Commission, 2022). Despite this expansion, systematic and structured professional development programs addressing youth wellbeing and positive

technology use remain limited. Many teachers rely on personal experience, informal strategies, or trial-and-error approaches to manage students' digital behaviors and emotional challenges. This reliance on individual coping mechanisms rather than evidence-based training highlights a critical gap in the professional support available to teachers (Wither, 2020).

Given these challenges, there is a clear need for empirical research that examines whether and how teacher professional development interventions can positively influence youth wellbeing and responsible technology use through improved teaching practices (Dreer, 2023). This study adopts a quantitative research approach to evaluate the effectiveness of teacher professional development interventions in promoting youth wellbeing and positive technology use at the higher secondary level. By focusing on teachers from Punjab and AJK, the study provides regionally relevant evidence that can inform teacher training policies, curriculum planning, and institutional support mechanisms. Ultimately, the findings aim to contribute to the broader educational research literature by empirically linking teacher professional development with student wellbeing outcomes and responsible engagement with digital technologies (UNESCO, 2021b).

1.1 Rationale of the Study

The rationale of this study is grounded in the growing concern over youth wellbeing and the increasing influence of digital technologies on adolescents' academic and psychological lives. As higher secondary students spend more time in technology-mediated environments, issues such as stress, anxiety, digital addiction, and unhealthy online behaviors have become more prevalent. Schools are expected to respond to these challenges; however, many teachers are not adequately prepared to address wellbeing and technology-related concerns through their instructional practices (Redecker, 2017). Teacher professional development offers a strategic mechanism to bridge this gap by equipping educators with the skills needed to promote emotional resilience and responsible technology use. Despite the importance of such interventions, limited empirical research has examined their effectiveness in the context of higher secondary education in Pakistan. This lack of evidence restricts informed policy decisions and the design of targeted training programs. By focusing on teachers from Punjab and Azad Jammu & Kashmir, this study addresses a critical regional and contextual gap in the literature. The research provides data-driven insights into how professional development interventions

influence teaching practices related to wellbeing and digital engagement (Redecker, 2017). Ultimately, the study seeks to support evidence-based educational reforms that enhance youth wellbeing, foster positive technology use, and strengthen the overall quality of higher secondary education.

1.2 Statement of the Problem

Despite increasing concerns about youth mental health and technology-related challenges at the higher secondary level, many teachers lack professional training to address these issues effectively. Existing teacher professional development programs often overlook wellbeing promotion and positive technology use. As a result, teachers may feel unprepared to guide students toward healthy digital habits and emotional resilience. In Pakistan, particularly in Punjab and Azad Jammu & Kashmir, limited empirical research has examined the effectiveness of teacher professional development interventions in this area. The absence of evidence-based strategies restricts informed policy decisions. Therefore, there is a need to quantitatively evaluate how teacher professional development interventions influence youth wellbeing and positive technology use.

1.3 Research Objectives

1. To examine the impact of teacher professional development interventions on promoting youth wellbeing at the higher secondary level.
2. To analyze the role of teacher professional development in fostering positive and responsible technology use among students.
3. To determine the relationship between teacher professional development interventions and teachers' wellbeing-oriented instructional practices.

1.4 Research Hypotheses

H1: Teacher professional development interventions have a significant positive impact on youth wellbeing at the higher secondary level.

H2: Teacher professional development interventions significantly promote positive technology use among higher secondary students.

H3: Teacher professional development interventions are positively associated with teachers' wellbeing-supportive instructional practices.

1.5 Significance of the Study

This study is significant as it provides empirical evidence on the role of teacher professional development in promoting youth wellbeing and responsible technology use. It informs policymakers about the importance of integrating wellbeing and digital citizenship into teacher training programs. Educational institutions can use the findings to design targeted professional development initiatives. Teachers may benefit by enhancing their capacity to support students' emotional and digital needs. The study contributes to limited regional literature from Punjab and AJK. It supports evidence-based educational reforms. Ultimately, the research promotes healthier learning environments at the higher secondary level.

2. LITERATURE REVIEW

2.1 Teacher Professional Development and Educational Effectiveness

Teacher professional development (TPD) is widely recognized as a central determinant of educational effectiveness and school improvement. Well-designed professional development programs enhance teachers' pedagogical knowledge, instructional skills, and professional confidence, enabling them to respond effectively to diverse classroom needs. Research consistently shows that continuous professional learning positively influences teaching quality, classroom management, and student learning outcomes (European Commission, 2022). Effective TPD emphasizes reflective practice, peer collaboration, and the practical application of new strategies rather than one-time training sessions. Teachers who engage in sustained professional development are more likely to adopt innovative and student-centered teaching approaches (Livingstone et al., 2019). Moreover, such programs increase teachers' motivation, job satisfaction, and commitment to the profession. In the context of student wellbeing, professional development equips teachers to identify emotional and behavioral challenges among students. This preparedness strengthens teacher–student relationships and fosters supportive learning environments. Consequently, teacher professional development serves as a foundational mechanism for delivering holistic and high-quality education (Ventista, 2023).

2.2 Youth Wellbeing in Educational Settings

Youth wellbeing is a multidimensional concept encompassing emotional, psychological, and social aspects that significantly influence students' academic engagement, behavior, and overall life satisfaction (Odgers & Jensen, 2020). Educational institutions play a critical role in

promoting wellbeing by creating safe, inclusive, and supportive environments where students feel valued and understood. Research highlights that teacher support and positive school climate are among the strongest predictors of student wellbeing. Teachers who demonstrate empathy, fairness, and emotional awareness help students develop resilience and coping strategies. Wellbeing-focused teaching practices have been shown to reduce stress, anxiety, and disengagement among learners (Twenge & Campbell, 2019). At the higher secondary level, wellbeing becomes particularly important due to academic pressure, examination stress, and transitional life decisions. Positive interactions between teachers and students contribute to emotional stability and a sense of belonging. Therefore, promoting youth wellbeing is not only a moral responsibility but also an essential educational objective linked to academic success (Dreer, 2023).

2.3 Technology Use and Adolescent Development

Technology use is deeply embedded in the daily lives of adolescents, shaping how they learn, communicate, and socialize. Digital tools offer substantial educational benefits, including access to information, interactive learning resources, and collaborative opportunities (Keles et al., 2020). However, excessive or unregulated technology use has been linked to several negative outcomes, such as sleep disturbances, anxiety, reduced attention span, and social withdrawal. Research indicates that adolescents often struggle to regulate their technology use independently, making guidance essential (Domoff et al., 2019). Positive technology use emphasizes balance, critical thinking, creativity, and ethical online behavior rather than complete restriction. Schools increasingly promote digital citizenship to help students navigate online environments responsibly. Teachers play a mediating role by setting expectations and modeling appropriate use. Structured educational guidance can transform technology into a resource that supports wellbeing rather than a source of risk. Hence, understanding technology's impact on adolescent development is crucial for modern education (Wither, 2019).

2.4 Teacher Role in Promoting Digital Wellbeing

Teachers play a decisive role in shaping students' attitudes and behaviors toward technology. Educators who are trained in digital wellbeing can integrate responsible technology practices into daily classroom instruction. Such teachers model balanced technology use, encourage reflection on online behavior, and discuss digital ethics openly with students (Rideout

& Robb, 2019). Research suggests that when teachers actively guide technology use, students are less likely to engage in problematic behaviors such as excessive screen time or unsafe online interactions (Common Sense Media, 2021). Professional development programs focused on digital wellbeing enhance teachers' confidence and competence in addressing emerging digital challenges. Teachers also act as mentors who help students navigate online risks, including cyber bullying and misinformation. Their influence extends beyond academic instruction to socio-emotional development and value formation. Therefore, teacher preparation and continuous training are central to successful digital wellbeing initiatives in schools (Wither, 2020).

2.5 Professional Development Interventions and Student Outcomes

Empirical evidence indicates that teacher professional development interventions can significantly improve student outcomes when they are aligned with clear educational goals. Interventions that focus on wellbeing have been shown to enhance classroom climate, student engagement, and emotional regulation (Schleicher, 2018). Teachers trained in socio-emotional learning strategies report improvements in student behavior, cooperation, and motivation. Similarly, technology-focused professional development supports responsible and purposeful digital integration in teaching practices (World Bank, 2018). When professional development combines wellbeing promotion with positive technology use, it produces holistic benefits for both teachers and students. Such integrated interventions encourage sustainable changes in instructional practices rather than short-term adjustments. Quantitative research consistently supports the effectiveness of these programs in improving educational outcomes. Therefore, systematic evaluation of teacher professional development interventions is critical for informed educational policy and practice (Hobbs & Coiro, 2019).

3. RESEARCH METHODOLOGY

3.1 Research Design

This study adopted a quantitative, cross-sectional research design to examine the relationships among teacher professional development, youth wellbeing promotion, and positive technology use. A quantitative approach was considered appropriate because it allows for objective measurement of variables and statistical testing of hypothesized relationships (Livingstone et al., 2019). The cross-sectional design involved collecting data at a single point in time, enabling the assessment of teachers' perceptions and practices as they currently exist. This

design supports hypothesis testing through numerical data analysis and facilitates comparison across groups. Moreover, the use of standardized instruments enhances objectivity and reduces researcher bias. The design also allows findings to be generalized to similar populations within the defined context.

3.2 Population

The population of the study comprised higher secondary school teachers from Punjab and Azad Jammu & Kashmir (AJK), Pakistan. These teachers are directly involved in educating adolescents at a critical developmental stage characterized by academic pressure and increased technology use. The population includes teachers from diverse educational settings, including urban and rural areas as well as public and private institutions. Selecting this population aligns closely with the study's objectives, which focus on the role of teachers in promoting youth wellbeing and responsible technology use. The inclusion of two provinces enhances the contextual richness of the study. It also strengthens the regional relevance and applicability of the findings to Pakistan's education system.

3.3 Sampling Technique

A stratified random sampling technique was employed to select participants for the study. Teachers were first categorized into strata based on province (Punjab and AJK) and type of institution (public and private). Random samples were then drawn from each stratum to ensure proportional representation. This technique was chosen to minimize sampling bias and ensure that key subgroups within the population were adequately represented. Stratified sampling improves the accuracy and credibility of the results by capturing variation across different institutional contexts. It also enhances the external validity of the study. Consequently, the sampling approach supports more reliable and balanced findings.

3.4 Sample Size

A total sample size of 300 teachers was selected for the study. This sample size is considered adequate for quantitative analysis, particularly for correlation and regression techniques commonly used in social science research. A sufficiently large sample ensures greater statistical power and increases the likelihood of detecting significant relationships among variables. It also reduces the margin of error and enhances the reliability of the findings. The selected sample size aligns with established quantitative research standards and methodological

guidelines. Furthermore, it supports the generalization of results to the broader population of higher secondary teachers in the selected regions.

3.5 Data Collection Instrument

Data were collected using a structured questionnaire designed specifically for the objectives of the study. The questionnaire employed a 5-point Likert scale ranging from strongly disagrees to strongly agree to measure key variables (Twenge & Campbell, 2019). Items in the instrument assessed teacher professional development experiences, wellbeing-supportive instructional practices, and approaches to positive technology use. The structured format ensured consistency in responses and facilitated quantitative analysis. Prior to the main data collection, the instrument was pilot tested to refine items and improve clarity. Reliability of the scale was established using internal consistency measures, ensuring the accuracy and dependability of the collected data.

3.6 Data Analysis Techniques

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including means, frequencies, and percentages, were used to summarize demographic information and overall response patterns. Inferential statistical techniques, such as correlation analysis, were applied to examine relationships among variables. Regression analysis was conducted to test the proposed research hypotheses and determine the predictive power of teacher professional development interventions. Statistical significance was assessed at the $p < 0.05$ level. The results of the analysis were systematically presented in tabular form to enhance clarity and interpretation.

4. DATA ANALYSIS

Table 1: Demographic Profile of Respondents (N = 300)

Demographic Variable	Category	Frequency (f)	Percentage (%)
Gender	Male	168	56.0
	Female	132	44.0
Province	Punjab	192	64.0
	AJK	108	36.0
Teaching Experience	1–5 Years	90	30.0

Demographic Variable	Category	Frequency (f)	Percentage (%)
	6–10 Years	126	42.0
	Above 10 Years	84	28.0
Institution Type	Public	176	58.7
	Private	124	41.3

Table 1 presents the demographic characteristics of the respondents. The majority of participants were male teachers, reflecting the gender distribution in higher secondary education. Most respondents belonged to Punjab, ensuring regional representation. Teachers with 6–10 years of experience formed the largest group, indicating a mature teaching workforce. Both public and private institutions were adequately represented. This diversity strengthens the generalizability of the findings across institutional and regional contexts.

Table 2: Descriptive Statistics of Study Indicators

Indicator	Mean	Std. Deviation
Teacher Professional Development (TPD)	3.91	0.68
Wellbeing-Supportive Teaching Practices	3.85	0.71
Positive Technology Use Promotion	3.78	0.74
Youth Wellbeing Perception	3.88	0.69

Table 2 reports the descriptive statistics of the major study indicators. The mean values indicate that teachers generally agreed with statements related to professional development, wellbeing practices, and technology use. Teacher professional development recorded the highest mean, suggesting adequate exposure to training initiatives. The relatively low standard deviations show consistency in responses. Overall, the results reflect positive perceptions toward wellbeing-oriented teaching. These descriptive results justify further inferential analysis.

Table 3: Reliability Analysis (Cronbach's Alpha)

Construct	No. of Items	Cronbach's Alpha
Teacher Professional Development	8	0.86

Construct	No. of Items	Cronbach's Alpha
Wellbeing-Supportive Practices	7	0.84
Positive Technology Use	6	0.82
Youth Wellbeing	7	0.88

Table 3 shows the reliability analysis of the research constructs. Cronbach's alpha values for all constructs exceed the recommended threshold of 0.70. This indicates high internal consistency among the questionnaire items. Youth wellbeing demonstrated the strongest reliability, reflecting coherent measurement. The results confirm the instrument's reliability. Therefore, the data are suitable for further statistical analysis.

Table 4: Factor Analysis – Construct Validity (KMO & Bartlett's Test)

Test	Value
Kaiser-Meyer-Olkin (KMO) Measure	0.87
Bartlett's Test of Sphericity	$\chi^2 = 2164.38$
Significance (p-value)	0.000

Table 4 presents the results of factor analysis adequacy tests. The KMO value exceeds the acceptable minimum of 0.60, indicating sampling adequacy. Bartlett's Test of Sphericity is statistically significant, confirming factorability of the data. These results validate the suitability of the dataset for factor analysis. Construct validity of the measurement model is established. Hence, the indicators accurately represent the underlying constructs.

Table 5: Correlation Matrix of Study Variables

Variable	TPD	Wellbeing Practices	Tech Use	Youth Wellbeing
TPD	1			
Wellbeing Practices	0.61**	1		
Positive Technology Use	0.58**	0.55**	1	
Youth Wellbeing	0.64**	0.62**	0.57**	1

Table 5 shows significant positive correlations among all study variables. Teacher professional development is strongly associated with wellbeing-supportive practices and youth wellbeing.

Positive technology use also shows meaningful relationships with wellbeing indicators. These results indicate that improvements in teacher training relate to better student outcomes. No multicollinearity issues are observed. The correlation findings support regression analysis.

Table 6: Regression Analysis – Impact of TPD on Youth Wellbeing

Predictor	β	t-value	p-value
Teacher Professional Development	0.64	9.31	0.000

Table 6 presents the regression results examining the impact of teacher professional development on youth wellbeing. The standardized beta coefficient indicates a strong positive effect. The relationship is statistically significant at $p < 0.001$. The R^2 value shows that professional development explains 41% of the variance in youth wellbeing. This indicates substantial predictive power. The findings confirm the effectiveness of teacher training interventions.

Table 7: Regression Analysis – TPD and Positive Technology Use

Predictor	β	t-value	p-value
Teacher Professional Development	0.58	8.42	0.000

Table 7 illustrates the effect of teacher professional development on promoting positive technology use. The beta value demonstrates a strong positive association. Statistical significance confirms the reliability of the relationship. The R^2 value indicates that professional development accounts for 34% variance in positive technology use. This suggests meaningful influence of training. Teachers' digital guidance improves with professional development exposure.

Table 8: Master Table – Hypotheses Testing Results

Hypothesis	Relationship	β	p-value	Result
H1	TPD → Youth Wellbeing	0.64	0.000	Supported
H2	TPD → Positive Technology Use	0.58	0.000	Supported
H3	TPD → Wellbeing Practices	0.61	0.000	Supported

Table 8 summarizes the results of hypotheses testing. All proposed hypotheses were statistically supported. Teacher professional development significantly predicts youth wellbeing and positive technology use. The strongest effect was observed for youth wellbeing. The findings confirm the theoretical assumptions of the study. Overall, professional development plays a decisive role in educational wellbeing outcomes. This master table provides a concise overview of empirical results.

5. FINDINGS

The findings of this study provide strong empirical evidence regarding the effectiveness of teacher professional development (TPD) interventions in promoting youth wellbeing and positive technology use at the higher secondary level. Descriptive analysis revealed that teachers generally reported positive perceptions of their professional development experiences, wellbeing-supportive instructional practices, and approaches to technology use. The relatively high mean scores across all indicators suggest that teachers recognize the importance of professional training in addressing students' emotional and digital needs. Low variability in responses further indicates consistency in teachers' perceptions across institutions and regions (Rideout & Robb, 2019).

Demographic analysis showed that the sample represented a balanced distribution of teachers across gender, teaching experience, province, and institutional type. Teachers from both Punjab and Azad Jammu & Kashmir participated actively, strengthening the regional relevance of the findings. The presence of teachers with varying levels of experience suggests that professional development interventions are relevant across career stages. Importantly, no major demographic distortions were observed, indicating that the findings are not biased toward a specific subgroup of teachers (Common Sense Media, 2021).

Reliability and validity analyses confirmed the robustness of the measurement instrument. Cronbach's alpha values for all constructs exceeded the recommended threshold,

demonstrating strong internal consistency. Factor analysis results further established construct validity, indicating that the questionnaire items accurately measured teacher professional development, wellbeing-supportive practices, positive technology use, and youth wellbeing. These results provide confidence that subsequent inferential analyses are based on reliable and valid data (OECD, 2020).

Correlation analysis revealed significant positive relationships among all major study variables. Teacher professional development was strongly associated with wellbeing-supportive teaching practices, positive technology use, and perceptions of youth wellbeing. These findings suggest that teachers who receive higher levels of professional training are more likely to implement practices that support students' emotional health and guide responsible technology use. The absence of multicollinearity indicates that each construct contributes uniquely to explaining youth wellbeing outcomes (Schleicher, 2018).

Regression analysis demonstrated that teacher professional development is a strong predictor of youth wellbeing. The results showed that professional development interventions explain a substantial proportion of variance in youth wellbeing, confirming the central role of teacher capacity building in supporting adolescents' psychological and emotional development. This finding validates the first research hypothesis and highlights the importance of investing in structured professional development programs for teachers (World Bank, 2018).

Further regression results indicated a significant positive effect of teacher professional development on the promotion of positive technology use. Teachers who reported higher levels of professional training were more effective in guiding students toward balanced, ethical, and purposeful use of digital tools. This finding supports the second hypothesis and underscores the role of trained teachers in mitigating the negative impacts of excessive or inappropriate technology use (Darling-Hammond et al., 2017).

Overall hypothesis testing results confirmed that all proposed hypotheses were supported by the data. Teacher professional development interventions significantly influenced youth wellbeing, positive technology use, and wellbeing-supportive instructional practices. These findings collectively demonstrate that professional development is a critical mechanism for translating educational policy goals into classroom-level practices. The results affirm that

empowering teachers through targeted training can produce meaningful improvements in student wellbeing and digital engagement at the higher secondary level.

6. DISCUSSION

The findings of this study provide compelling empirical support for the role of teacher professional development (TPD) in promoting youth wellbeing and positive technology use at the higher secondary level. The results demonstrate that teachers who participate in structured professional development programs are better equipped to implement wellbeing-supportive instructional practices and guide students toward responsible digital engagement. These findings align with contemporary educational research emphasizing that teacher capacity building is central to improving both academic and non-academic student outcomes. By focusing on teachers rather than solely on students, the study reinforces the idea that sustainable improvements in youth wellbeing must be rooted in systemic professional support for educators (Darling-Hammond et al., 2017).

The significant positive relationship between teacher professional development and youth wellbeing supports the view that teachers play a pivotal role in shaping students' emotional and psychological experiences in school. Teachers who receive training in wellbeing-oriented pedagogy are more likely to create supportive classroom environments, recognize signs of emotional distress, and respond effectively to students' needs. This finding is consistent with prior studies that highlight teacher empathy, emotional awareness, and classroom climate as key determinants of adolescent wellbeing. At the higher secondary level, where students face intense academic pressure and developmental challenges, the presence of trained and supportive teachers becomes particularly critical (OECD, 2017).

The study also found that teacher professional development significantly promotes positive technology use among students. This result underscores the importance of equipping teachers with the knowledge and skills needed to address digital challenges in educational settings. Rather than discouraging technology use altogether, trained teachers are more capable of promoting balanced, ethical, and purposeful engagement with digital tools (UNESCO, 2019a). This finding aligns with research on digital citizenship and adolescent development, which emphasizes that guidance and modeling by educators, can mitigate risks associated with excessive or unregulated technology use. In this sense, professional development serves as a

protective factor that transforms technology from a potential source of harm into a resource for learning and wellbeing (Council of Europe, 2020).

Another important contribution of this study lies in its examination of wellbeing-supportive instructional practices as an outcome of teacher professional development. The results suggest that professional training influences not only teachers' attitudes but also their day-to-day classroom practices. Teachers who reported higher levels of professional development were more likely to adopt instructional strategies that foster emotional safety, student engagement, and positive teacher–student relationships. This finding supports theoretical perspectives that view professional development as a mechanism for translating policy goals into practical pedagogical change. It also reinforces the idea that wellbeing promotion should be embedded in everyday teaching rather than treated as an add-on (World Health Organization, 2020).

From a contextual perspective, the findings are particularly significant for Punjab and Azad Jammu & Kashmir, where rapid integration of technology in education has not always been accompanied by systematic teacher training. The results indicate that even within resource-constrained environments, targeted professional development can yield meaningful benefits. This suggests that policy interventions focused on teacher training may be more cost-effective and sustainable than isolated student-centered programs. The regional focus of the study adds to the limited empirical literature from Pakistan and highlights the need for contextually relevant professional development models (OECD, 2021).

Overall, the discussion of findings suggests that teacher professional development functions as a strategic lever for improving youth wellbeing and positive technology use at the higher secondary level. By strengthening teachers' competencies, professional development interventions create ripple effects that enhance classroom climate, student behavior, and emotional resilience. The results support an integrated approach to education in which academic instruction, wellbeing promotion, and digital responsibility are treated as interconnected goals. These insights provide a strong foundation for policy reform, institutional planning, and future research aimed at fostering healthier and more supportive learning environments for adolescents (Keles et al., 2020).

7. CONCLUSION

This study concludes that teacher professional development interventions play a decisive and positive role in promoting youth wellbeing and encouraging positive technology use at the higher secondary level. The empirical evidence demonstrates that teachers who receive structured and targeted professional training are better equipped to implement wellbeing-supportive instructional practices and to guide students toward balanced, ethical, and responsible engagement with digital technologies. These findings confirm that teacher capacity building is a foundational mechanism for addressing the psychological and digital challenges faced by adolescents in contemporary educational environments.

The results further highlight that youth wellbeing cannot be effectively promoted through student-focused initiatives alone; rather, it requires sustained investment in teachers as key agents of change. Professional development enhances teachers' awareness of students' emotional needs, strengthens teacher–student relationships, and contributes to the creation of supportive classroom climates. In addition, trained teachers are more capable of integrating technology into instruction in ways that enhance learning while minimizing risks associated with excessive or inappropriate use.

In the context of Punjab and Azad Jammu & Kashmir, where technology integration in education has expanded rapidly but professional support has lagged behind, the study provides timely and policy-relevant insights. The findings underscore the need for systematic, evidence-based professional development programs that address both wellbeing and digital citizenship. Overall, the study affirms that investing in teacher professional development is essential for fostering holistic student development, improving educational quality, and ensuring that technology serves as a positive force in the lives of higher secondary students.

8. RECOMMENDATIONS

8.1 Integrate wellbeing and digital citizenship into teacher training programs

Teacher education and training programs should formally integrate components related to youth wellbeing and digital citizenship. These components should focus on mental health awareness, socio-emotional learning, and responsible technology use. By embedding wellbeing

and digital ethics into pre-service and in-service training, teachers can develop a holistic understanding of their role beyond academic instruction. Such integration will enable teachers to recognize emotional distress and guide students toward healthy digital behaviors. Structured modules and practical activities should be included to ensure effective learning. This approach will strengthen teachers' preparedness to address contemporary classroom challenges.

8.2 Provide continuous professional development for higher secondary teachers

Professional development should be an ongoing process rather than a one-time intervention for higher secondary teachers. Continuous training opportunities allow teachers to update their skills in response to evolving student needs and technological advancements. Regular workshops, seminars, and mentoring programs can reinforce wellbeing-focused teaching practices. Continuous professional development also helps teachers reflect on their experiences and improve classroom strategies. Institutional support for sustained training enhances teacher motivation and professional growth. Ultimately, continuous learning contributes to improved student wellbeing and positive technology use.

8.3 Develop region-specific training initiatives for Punjab and AJK

Educational authorities should design professional development initiatives that are sensitive to the regional contexts of Punjab and Azad Jammu & Kashmir. Differences in infrastructure, access to technology, and socio-cultural conditions require tailored training approaches. Region-specific programs can address local challenges faced by teachers and students more effectively. Such initiatives ensure relevance and practical applicability of training content. Collaboration with local education departments and institutions can strengthen implementation. Contextualized training enhances the overall effectiveness of professional development interventions.

8.4 Encourage schools to support wellbeing-oriented teaching practices

Schools should actively support and institutionalize wellbeing-oriented teaching practices within their academic culture. School leadership can play a key role by promoting supportive policies, providing resources, and encouraging collaborative teaching environments. Teachers should be given the flexibility to integrate wellbeing activities into regular instruction. Recognition and encouragement of wellbeing-focused initiatives can increase teacher

commitment. Supportive school environments foster positive teacher–student relationships. This institutional backing strengthens the impact of professional development efforts.

8.5 Conduct longitudinal studies to assess long-term impact

Future research should adopt longitudinal designs to examine the long-term effects of teacher professional development interventions on youth wellbeing and technology use. Longitudinal studies can capture changes in teaching practices and student outcomes over time. Such research provides deeper insights into the sustainability of intervention effects. It also helps identify factors that influence long-term success or decline. Evidence from longitudinal data can guide policy refinement and program improvement. This approach strengthens the research base for educational decision-making.

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