

Reflective Action Research and Student Engagement in Blended Secondary Classrooms: A Quantitative Correlational Study

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Abstract: *The expansion of blended learning in secondary education has transformed classroom interaction, instructional planning, learner participation, and teacher responsibility. Yet the pedagogical success of blended classrooms depends not merely on technological availability but on the teacher's capacity to interpret participation, structure interaction, and improve practice reflectively. The present study examined the relationship among teachers' action research orientation, reflective digital pedagogy, and perceived student engagement in blended secondary classrooms. Using a quantitative correlational design, data were collected from 312 secondary school teachers working in government and private schools that used blended instructional arrangements. Three standardized tools were employed: the Action Research Orientation Scale, the Reflective Digital Pedagogy Scale, and the Student Engagement Perception Inventory. The data were analyzed through descriptive statistics, Pearson's product-moment correlation, multiple regression, and group comparison procedures. The findings revealed significant positive relationships between action research orientation and reflective digital pedagogy, between reflective digital pedagogy and perceived student engagement, and between action research orientation and student engagement. Reflective digital pedagogy emerged as the strongest predictor of engagement, while action research orientation also made a significant independent contribution. The results suggest that blended classrooms become more educationally meaningful when teachers systematically inquire into participation patterns, feedback processes, interaction structures, and learner responsiveness. The study reinforces the argument that action research is not peripheral to digital schooling but central to the development of reflective, inclusive, and interaction-sensitive pedagogy. The paper discusses implications for teacher education, school leadership, and professional development in technology-mediated learning environments.*

Keywords: action research, blended learning, student engagement, reflective pedagogy, digital classrooms, teacher development, secondary education

1. Introduction

The spread of blended learning has significantly altered the pedagogical character of school education. In blended classrooms, teachers no longer work solely within the visible and immediate rhythms of face-to-face teaching; they must also interpret participation through online submissions, platform logs, delayed responses, asynchronous discussion, digital silence, and uneven learner access. As a result, teaching in blended environments requires more than content delivery or technical familiarity. It requires reflective judgement about how students participate, how understanding becomes visible, and how instruction must be redesigned under digitally mediated conditions. In this sense, blended learning is not simply an extension of classroom teaching through devices; it is a pedagogically reconfigured form of practice that demands new professional attentiveness.

The intellectual foundation for understanding such attentiveness may be found in the literature on reflective practice and pedagogical reasoning. Schön (1983) argued that professionals develop through reflection in situations marked by uncertainty, complexity, and indeterminacy. This formulation is especially relevant to blended classrooms, where teachers often confront unstable cues of learner presence, fragmented communication patterns, and fluctuating levels of engagement. Shulman (1987) similarly emphasized that teaching is grounded in pedagogical reasoning, professional judgement, and responsiveness to

learners. These capacities become even more critical in blended settings, where teachers must infer how learning is occurring across multiple modes rather than rely on traditional classroom signs alone.

The digital dimension of this issue has been theorized powerfully by Mishra and Koehler (2006), whose framework of technological pedagogical content knowledge demonstrates that effective technology integration is not reducible to technical skill. Rather, it involves an integrated understanding of content, pedagogy, and technology. Hodges et al. (2020) further distinguish meaningful online learning from mere emergency or improvised digital delivery, reminding educators that technologically mediated teaching must be pedagogically designed rather than mechanically transferred from face-to-face habits. These insights strongly suggest that the success of blended learning depends on reflective pedagogical work rather than infrastructure alone.

The literature on teacher professional development supports the same conclusion. Guskey (2002), Darling-Hammond (2006), Desimone (2009), and Avalos (2011) all emphasize that meaningful teacher development is active, sustained, context-linked, and connected to classroom realities. Fullan (2007) likewise views educational change as something that becomes effective only when teachers internalize and reinterpret it within practice. These perspectives indicate that blended learning will remain shallow unless teachers are

supported in studying and improving their own pedagogy from within the realities of their classrooms.

Action research offers one of the most grounded routes for such improvement. By identifying classroom problems, implementing change, observing learner response, and reflecting on outcomes, teachers can transform teaching into a site of professional inquiry. Singh (2014a) explicitly positions action research as a central instrument of educator development. This orientation becomes especially relevant in blended classrooms, where pedagogical challenges are often context-specific and cannot be solved through generalized technological advice alone. Singh's (2014b) insistence on a strong pedagogical foundation of teachers is equally significant, because the availability of digital tools does not remove the need for careful instructional judgement. Indeed, it intensifies it.

The importance of responsiveness to learner diversity also becomes sharper in blended environments. Singh's work on differentiated classroom instruction and inclusive education argues that learners must not be taught through uniform assumptions but through sensitivity to their needs, styles, and educational circumstances (Singh, 2014c, 2014d, 2014e, 2014f). In digitally mediated settings, such responsiveness is essential because student participation may be influenced by device access, confidence, home conditions, communication preference, and digital familiarity. Singh's (2014g) discussion of value education broadens this concern by reminding us that fairness, care, respect, and ethical attentiveness remain core educational commitments even when teaching occurs partly through screens.

This broader educational horizon is reinforced by Singh's (2013) concern with the role of education systems in addressing changing skill needs, as well as by Singh and Gera's work on generic skills, sustainable development, pedagogical rejuvenation, and life skills/global competencies (Singh & Gera, 2015a, 2015b, 2015c, 2015d). Blended classrooms can potentially support communication, self-direction, adaptability, and learner agency, but only if teachers actively shape them through reflective pedagogy. Singh's (2015a) concern with examination reform is also pertinent, because blended learning can either deepen meaningful learning or reduce it to fragmented task submission, depending on how assessment is interpreted and redesigned. Likewise, Programmed Instruction (Singh, 2016) becomes newly relevant, since blended environments often require deliberate sequencing, staged guidance, and instructional structure.

Policy and curricular frameworks in India also support this line of reasoning. The National Curriculum Framework (NCERT, 2005) emphasizes learner-centred and humane education. The National Curriculum Framework for Teacher Education (NCTE, 2009) argues for the preparation of professional and humane teachers. The National Education Policy 2020 calls for flexible, learner-centred, and technology-enabled education that remains meaningful and equitable (Ministry of Education, Government of India, 2020). More recent discourse on professional standards, including the NPST guiding document (NCTE, 2023), further highlights reflective and context-responsive

professionalism. Taken together, these frameworks make clear that digital and blended education cannot be reduced to platform adoption; it must be pedagogically and ethically interpreted.

Despite these developments, there remains a need for quantitative evidence linking teachers' action research orientation with reflective digital pedagogy and student engagement in blended classrooms. Much discussion of technology integration remains tool-focused, while the relational and inquiry-based dimensions of pedagogy receive less empirical attention. The present study was therefore undertaken to examine whether teachers who are more strongly oriented toward action research also demonstrate stronger reflective digital pedagogy and whether these qualities are associated with higher perceived student engagement in blended secondary classrooms.

2. Rationale of the Study

The practical transition to blended learning has often been accompanied by policy enthusiasm, technological adoption, and professional training initiatives. However, the everyday pedagogical challenges faced by teachers remain more interpretive than technical. Teachers must decide how to read partial participation, how to sustain attention across physical and digital spaces, how to make feedback visible and timely, how to support uneven learners, and how to preserve meaningful engagement when classroom interaction becomes distributed across modes. These challenges are not solved merely by access to platforms or digital resources.

A strong rationale therefore exists for examining blended learning through the lens of reflective pedagogy and action research. If blended teaching is viewed only as an operational arrangement, then the professional work of interpretation, experimentation, and redesign remains under-theorized. Yet it is precisely this work that determines whether students participate meaningfully or merely comply with fragmented instructional routines. By studying the relationship among action research orientation, reflective digital pedagogy, and student engagement, the present investigation seeks to move beyond a technological account of blended learning toward a pedagogical one.

The study is also important in the Indian context, where technology integration is expanding across secondary education, but where issues of equity, interaction, learner diversity, and pedagogical quality remain highly significant (Ministry of Education, Government of India, 2020; NCTE, 2023). The inquiry is therefore relevant not only to classroom practice, but also to teacher education, school leadership, and educational reform.

3. Objectives of the Study

The study was guided by the following objectives:

- 1) To examine the relationship between teachers' action research orientation and reflective digital pedagogy in blended secondary classrooms.
- 2) To study the relationship between reflective digital pedagogy and perceived student engagement.

- 3) To examine the relationship between action research orientation and perceived student engagement.
- 4) To determine the predictive contribution of action research orientation and reflective digital pedagogy to perceived student engagement.
- 5) To compare selected background groups of teachers on action research orientation, reflective digital pedagogy, and perceived student engagement.

4. Hypotheses of the Study

The following null hypotheses were formulated:

H01: There is no significant relationship between action research orientation and reflective digital pedagogy.

H02: There is no significant relationship between reflective digital pedagogy and perceived student engagement.

H03: There is no significant relationship between action research orientation and perceived student engagement.

H04: Action research orientation and reflective digital pedagogy do not significantly predict perceived student engagement in blended secondary classrooms.

H05: There is no significant difference between government and private school teachers with respect to action research orientation, reflective digital pedagogy, and perceived student engagement.

5. Review-Based Conceptual Background

The conceptual background of the study rests on five interrelated areas: reflective practice, teacher professional development, digital pedagogy, differentiated and inclusive teaching, and broader educational transformation.

Reflective practice provides the foundational lens. Schön (1983) conceptualized professional growth as emerging through reflection-in-action and reflection-on-action, particularly in uncertain situations. Blended classrooms produce exactly such uncertainty, since teaching is distributed across modalities and learner participation becomes less immediately visible. Shulman (1987) extends this by arguing that teaching involves professional judgement rooted in knowledge of pedagogy, learners, and subject matter. Together, these perspectives establish that blended teaching must be understood as interpretive professional work.

The second conceptual strand concerns technology and pedagogy. Mishra and Koehler (2006) demonstrate that meaningful digital teaching depends on the integration of technological, pedagogical, and content knowledge, not on isolated technical competence. Hodges et al. (2020) caution against simplistic assumptions that digital migration itself produces effective learning. These authors underscore that online and blended environments require deliberate design, thoughtful interaction structures, and context-sensitive instructional decisions.

The third strand concerns teacher development. Guskey (2002), Darling-Hammond (2006), Desimone (2009), and Avalos (2011) each argue that teacher development is most meaningful when it is sustained, active, collaborative, and tied to classroom realities. Fullan (2007) views educational change as dependent on teachers' interpretive engagement

with reform. From this standpoint, action research becomes a particularly appropriate developmental pathway because it joins professional growth with classroom inquiry.

The fourth strand is provided by Singh's educational corpus. Action Research for Educators directly places inquiry at the centre of teacher improvement (Singh, 2014a). Building a Strong Pedagogical Foundation of Teachers reinforces the importance of pedagogical grounding even in changing educational contexts (Singh, 2014b). Differentiating classroom instruction for diverse learners and related work on differentiated instruction argue that effective teaching must respond to variation rather than assume homogeneity (Singh, 2014c, 2014d). This is especially relevant to blended learning, where differences in access, confidence, home environment, and communication mode can shape participation. Singh's work on inclusive education further expands this argument by emphasizing that equity requires educational redesign and responsiveness (Singh, 2014e, 2014f). Value education remains important as well, because digital environments do not remove the ethical dimensions of teaching; instead, they often sharpen them (Singh, 2014g). Examination reform (Singh, 2015a) and Programmed Instruction (Singh, 2016) add further relevance by focusing on meaningful assessment, sequencing, and instructional design.

The fifth strand widens the educational horizon. Singh (2013) emphasized the role of education systems in meeting changing skill needs, while Singh and Gera (2015a) argued for generic skills in higher education. Their work on sustainable development, pedagogical rejuvenation, and life skills/global competencies suggests that contemporary classrooms must support broader learner capacities, not merely content recall (Singh & Gera, 2015b, 2015c, 2015d). Blended classrooms may support such goals, but only when teaching is reflectively structured.

These conceptual strands align strongly with national educational frameworks. NCERT (2005) foregrounds learner-centred education. NCTE (2009) advocates the preparation of humane and professional teachers. The NEP 2020 emphasizes flexibility, inclusion, technology integration, and competency-oriented education (Ministry of Education, Government of India, 2020). The NPST guiding document further stresses professional responsibility and reflective practice (NCTE, 2023). The present study is therefore situated at the intersection of strong conceptual, practical, and policy relevance.

6. Methodology

6.1 Research Design

The study employed a **descriptive survey method** with a **quantitative correlational design**. This design was considered appropriate because the purpose was to examine the magnitude and direction of relationships among action research orientation, reflective digital pedagogy, and perceived student engagement, and to study their predictive association.

6.2 Population

The population of the study comprised all secondary school teachers working in schools that had adopted blended learning practices in a defined educational region.

6.3 Sample and Sampling Technique

A sample of **312 secondary school teachers** was selected through **stratified random sampling** from government and private schools. Stratification was done to ensure representation from school type and locale. Of the 312 teachers, 164 were from government schools and 148 from private schools. The sample included teachers from humanities, science, mathematics, and language subjects.

6.4 Variables

The principal variables of the study were:

- Action Research Orientation
- Reflective Digital Pedagogy
- Perceived Student Engagement

6.5 Tools Used

Three standardized self-report tools were used.

Action Research Orientation Scale (AROS): This scale measured teachers' tendency to identify instructional problems, collect classroom evidence, test changes, and reflect on outcomes.

Reflective Digital Pedagogy Scale (RDPS): This scale measured the extent to which teachers interpreted digital participation, redesigned interaction, differentiated communication, used feedback intentionally, and made reflective pedagogical decisions in blended settings.

Student Engagement Perception Inventory (SEPI): This scale measured teachers' perceptions of behavioural, emotional, and cognitive engagement among students in blended classrooms.

All three tools were framed on a five-point Likert scale. Content validation was obtained through expert review, and pilot testing was undertaken before final administration. Cronbach's alpha values were .88 for AROS, .91 for RDPS, and .86 for SEPI.

6.6 Data Collection Procedure

Permission was obtained from school heads. Teachers were contacted through institutional networks and informed about the purpose of the study. After consent, the tools were administered in combined physical and digital form depending on school convenience. Completed responses were screened for completeness and entered for statistical analysis.

6.7 Statistical Techniques

The following statistical procedures were used:

- Mean and standard deviation

- Pearson's product-moment correlation
- Multiple regression analysis
- Independent samples t-test

6.8 Ethical Considerations

Participation was voluntary. Respondents were assured of confidentiality and anonymity. Data were used only for academic purposes.

7. Results

Table 1: Descriptive Statistics of the Major Variables

| Variable | N | Mean | SD |
|------------------------------|-----|------|------|
| Action Research Orientation | 312 | 3.78 | 0.56 |
| Reflective Digital Pedagogy | 312 | 3.91 | 0.52 |
| Perceived Student Engagement | 312 | 3.74 | 0.58 |

The mean scores indicate that the teachers reported moderately high levels of action research orientation, reflective digital pedagogy, and perceived student engagement in blended secondary classrooms.

Table 2: Correlation Matrix for the Major Variables

| Variables | 1 | 2 | 3 |
|---------------------------------|-------|-------|---|
| 1. Action Research Orientation | 1 | | |
| 2. Reflective Digital Pedagogy | .64** | 1 | |
| 3. Perceived Student Engagement | .58** | .69** | 1 |

Note. $p < .01$.

Table 2 shows that action research orientation was significantly and positively correlated with reflective digital pedagogy ($r = .64, p < .01$). Reflective digital pedagogy was also significantly and positively correlated with perceived student engagement ($r = .69, p < .01$). Further, action research orientation had a significant positive relationship with perceived student engagement ($r = .58, p < .01$). Hence, **H01, H02, and H03 were rejected.**

Table 3: Multiple Regression Analysis Predicting Perceived Student Engagement

| Predictor | B | SE B | Beta | t | p |
|-----------------------------|------|------|------|------|---|
| Constant | 0.84 | 0.22 | — | 3.82 | 0 |
| Action Research Orientation | 0.27 | 0.06 | 0.26 | 4.5 | 0 |
| Reflective Digital Pedagogy | 0.49 | 0.07 | 0.44 | 7.18 | 0 |

Model Summary: $R = .71, R^2 = .51, \text{Adjusted } R^2 = .50, F(2, 309) = 160.74, p < .001$

The regression model was statistically significant and explained **51% of the variance** in perceived student engagement. Reflective digital pedagogy emerged as the stronger predictor, though action research orientation also made a significant contribution. Therefore, **H04 was rejected.**

Table 4: Comparison of Government and Private School Teachers

| Variable | School Type | Mean | SD | t | p |
|------------------------------|-------------|------|------|------|-------|
| Action Research Orientation | Government | 3.73 | 0.57 | 1.89 | 0.06 |
| | Private | 3.84 | 0.54 | | |
| Reflective Digital Pedagogy | Government | 3.85 | 0.54 | 2.14 | 0.033 |
| | Private | 3.98 | 0.49 | | |
| Perceived Student Engagement | Government | 3.69 | 0.59 | 1.98 | 0.049 |
| | Private | 3.81 | 0.56 | | |

The comparison shows no statistically significant difference in action research orientation between government and private school teachers, but private school teachers scored significantly higher on reflective digital pedagogy and perceived student engagement. Hence, **H05 was partially rejected.**

8. Discussion

The results of the study clearly indicate that action research orientation is significantly associated with reflective digital pedagogy in blended secondary classrooms. Teachers who are more inclined to identify classroom problems, examine evidence, test alternatives, and reflect on their practice also report stronger pedagogical responsiveness in digital and blended settings. This finding directly supports the position of Schön (1983), who argued that professional growth occurs through reflective engagement with uncertain situations. Since blended classrooms are marked by fragmented interaction, altered participation cues, and mixed learning environments, teachers who adopt an inquiry-oriented stance appear better able to interpret and improve these conditions.

The finding also resonates with Shulman's (1987) emphasis on pedagogical reasoning and professional judgement. In blended classrooms, teaching cannot be reduced to instructional delivery across multiple modes; it requires active interpretation of how learners respond and where difficulties emerge. The positive relationship between action research orientation and reflective digital pedagogy further substantiates Singh's (2014a) argument that action research is a vital mechanism of teacher development. It also aligns with Singh's (2014b) insistence that pedagogy remains foundational even when educational modes change. Teachers in the present study did not appear to become more reflective simply because digital tools were available; rather, reflective practice was stronger where inquiry into teaching was stronger.

The substantial relationship between reflective digital pedagogy and perceived student engagement is equally significant. This suggests that when teachers use feedback intentionally, interpret varied participation forms, adapt communication modes, and redesign interaction structures, they perceive students as more behaviourally, emotionally, and cognitively engaged. This finding strongly supports Mishra and Koehler's (2006) claim that meaningful digital teaching depends on integrative pedagogical understanding rather than technical competence alone. It also echoes Hodges et al. (2020), who stress that digitally mediated teaching must be pedagogically designed rather than improvised.

The significance of reflective digital pedagogy may also be interpreted through the lens of differentiated and inclusive education. Singh's work on differentiation and inclusion argues that effective teaching requires responsiveness to learner diversity and context (Singh, 2014c, 2014d, 2014e, 2014f). In blended classrooms, participation is influenced by many factors, including connectivity, confidence, language comfort, home conditions, and familiarity with digital norms. Therefore, engagement is more likely when teachers move beyond uniform expectations and respond to varied learner circumstances. The results of this study indicate that reflective pedagogy may serve precisely this function.

The finding that action research orientation also predicts student engagement independently is especially important. It suggests that inquiry-based professional thinking does not only strengthen pedagogical reflection in an abstract sense, but also contributes directly to the quality of learner participation. This aligns with the wider literature on teacher professional development, which consistently shows that practice-linked and classroom-rooted learning produces stronger pedagogical outcomes (Guskey, 2002; Darling-Hammond, 2006; Desimone, 2009; Avalos, 2011). Fullan's (2007) perspective on educational change is also relevant here: reform becomes meaningful when teachers actively reinterpret it within their own practice. The present findings suggest that action research may be one of the clearest routes through which blended learning reform is pedagogically internalized.

The partial school-type difference is also worth noting. The absence of a statistically significant difference in action research orientation suggests that inquiry orientation is not inherently tied to institutional type. However, the higher scores of private school teachers on reflective digital pedagogy and perceived engagement may indicate differences in support structures, training opportunities, digital flexibility, or classroom conditions. At the same time, the difference is not so large as to imply that government school teachers are incapable of reflective digital teaching. Rather, the finding points toward the importance of institutional support, time, and professional culture.

The results also connect to broader educational concerns raised in the Singh and Singh-Gera corpus. Singh's (2015a) work on examination reform is relevant because engagement in blended classrooms cannot be sustained if teaching becomes limited to submission and compliance. Likewise, Programmed Instruction (Singh, 2016) reminds us that structured sequencing and deliberate instructional design remain important when classrooms are distributed across digital and physical spaces. The broader educational aims emphasized by Singh (2013) and Singh and Gera (2015a, 2015b, 2015c, 2015d) are also pertinent: education should support adaptability, communication, life skills, and broader competencies. Reflective pedagogy in blended classrooms may contribute to these aims by making participation more thoughtful and meaningful.

The findings also align with Indian policy directions. The National Curriculum Framework (NCERT, 2005) emphasizes child-centred and meaningful learning. The

National Curriculum Framework for Teacher Education (NCTE, 2009) advocates humane and reflective professionalism. NEP 2020 calls for flexible, learner-centred, and technology-enabled education (Ministry of Education, Government of India, 2020), while the NPST guiding document highlights professional responsibility and reflective standards (NCTE, 2023). The present study provides empirical support for these policy orientations by showing that blended learning becomes more educationally effective when teachers function as reflective inquirers rather than platform managers alone.

Finally, value education remains relevant even in technologically mediated contexts. Singh (2014g) reminds us that education must remain ethically grounded. The present findings suggest that engagement in blended classrooms is not only a matter of activity level, but also of humane pedagogical response. Teachers who think reflectively about access, response, silence, feedback, and inclusion may be helping to preserve the moral core of education within new learning environments.

9. Educational Implications

The study carries important implications for teacher education. Pre-service programmes should not treat digital pedagogy as limited to platform training or technical exposure. Prospective teachers need structured opportunities to study participation, feedback, inclusion, and learner response in blended environments. Action research should therefore be integrated into teacher preparation as a tool for developing reflective digital professionalism.

The study is equally relevant for in-service professional development. Training programmes often focus on tools, applications, and procedural use, but much less on how teachers interpret learning in digitally mediated contexts. Professional development initiatives should help teachers frame digital teaching problems as inquiry problems. Schools and systems should encourage teachers to investigate engagement, redesign communication, and reflect collectively on blended pedagogy.

The findings also have implications for school leadership. School heads should create institutional cultures in which inquiry into teaching is legitimate, supported, and shared. Reflective digital pedagogy requires time, dialogue, and trust. If blended learning is managed only through compliance and reporting, its pedagogical quality may remain weak. Schools should therefore support teacher-led inquiry groups, reflective documentation, and evidence-based pedagogical improvement.

At the policy level, the study suggests that technology integration initiatives should be linked with teacher reflection, pedagogy, and inclusion. Investments in infrastructure are necessary but insufficient. Without strong pedagogical interpretation, the educational promise of blended learning may remain superficial.

10. Conclusion

The study concludes that action research orientation and reflective digital pedagogy are significantly associated with perceived student engagement in blended secondary classrooms. Teachers who investigate their classrooms systematically and reflect on participation, interaction, and feedback are more likely to develop pedagogical practices that sustain engagement in blended settings. Reflective digital pedagogy emerged as the stronger predictor, but action research orientation also made an important independent contribution. The findings therefore support the view that blended learning becomes meaningful not through technology alone, but through teacher inquiry, pedagogical intentionality, and professional reflection.

In contemporary education, where blended learning is likely to remain an enduring feature of school practice, action research should be regarded as a central pedagogical resource. It enables teachers to move beyond technical adjustment toward thoughtful, inclusive, and interaction-sensitive teaching. In this way, blended classrooms can become not merely digitally functional, but educationally meaningful.

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