

The Impact of PISA-Style Formative Assessments on the Critical Reading Literacy of Senior High School Students in Dolores National High School

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Abstract

This study examined the effectiveness of integrating Programme for International Student Assessment (PISA)-style formative assessments into the Trends, Networks, and Critical Thinking in the 21st Century (TNCT) course to enhance the critical reading literacy of Senior High School students at Dolores National High School during the academic year 2025–2026. Anchored in the PISA reading literacy framework and formative assessment principles, the study employed a quantitative quasi-experimental pretest–post-test design involving 79 Humanities and Social Sciences (HUMSS) students, comprising 41 experimental and 38 control participants selected through purposive sampling. Data were collected using a researcher-developed, validated 50-item Critical Reading Literacy Assessment measuring locating information, understanding and interpreting, and reflecting and evaluating. The intervention incorporated authentic reading materials, including infographics, data matrices, and contrasting policy texts, supported by continuous diagnostic feedback. Results showed that the experimental group's overall mean score increased from 20.8 to 38.8, compared with 20.5 to 21.1 in the control group, with a statistically significant post-intervention difference reported ($p < 0.01$). Improvements were observed across locating information (+5.05), understanding and interpreting (approximately +7.10), and reflecting and evaluating (+6.05). The findings indicated that PISA-style formative assessments were associated with substantial improvements in higher-order critical reading competencies. The study recommended integrating diagnostic feedback, authentic assessment tasks, and structured instructional resources into TNCT instruction. The findings support Sustainable Development Goal (SDG) 4, Quality Education, and relate to SDG 16, Peace, Justice, and Strong Institutions, through the development of critical literacy and evidence-based reasoning. The study contributes to educational sustainability by informing continuous instructional improvement, institutional assessment practices, and the development of students' analytical competencies for informed civic participation.

Keywords: Critical Reading Literacy; Formative Assessment; Higher-Order Thinking Skills; PISA-Style Assessments; Quasi-Experimental Design; Senior High School; Trends, Networks, and Critical Thinking in the 21st Century

1. Introduction

Critical reading literacy extends beyond basic comprehension to the interpretation, synthesis, and evaluation of information across diverse textual formats. In Social Science education, these competencies enable students to analyze societal trends, evaluate perspectives, and make evidence-based judgments (Ananiadou & Claro, 2021; Mo, 2026; Britt et al., 2023; Cho et al., 2021). The Programme for International Student Assessment (PISA) emphasizes higher-order reading competencies essential for understanding complex information and contemporary social issues (Greiff et al., 2024; Shiel, 2025). This study examined the integration of PISA-style formative assessments into Trends, Networks, and Critical Thinking in the 21st Century (TNCT) to determine changes in the critical reading literacy of Senior High School students at Dolores National High School.

Critical reading involves locating information, understanding and interpreting ideas, and reflecting on and evaluating textual evidence across continuous, non-continuous, and multiple-text formats (Kanniainen et al., 2022; Rouet et al., 2020; Delgado & Salmerón, 2023; Ingram, 2022). These competencies align with TNCT, which develops students' abilities to examine societal patterns, interconnected networks, and emerging global challenges (Department of Education [DepEd], 2016; Durban & Catalan, 2022). Effective TNCT instruction therefore requires learners to interpret diverse information sources, evaluate competing perspectives, and critically analyze contemporary issues (Malipot, 2024; San Juan & Reyes, 2025).

PISA-style assessments emphasize authentic reading tasks requiring information retrieval, interpretation, inference, and critical evaluation (Cho et al., 2021; Gatcho, 2026). Formative assessment complements these competencies through continuous feedback, performance monitoring, and instructional adjustments that support learning improvement (Tuan, 2026; Xuan et al., 2022). Integrating PISA-style tasks into formative assessment may strengthen critical reading by identifying comprehension difficulties and providing targeted instructional support (Heritage & Popham, 2021; Yan et al., 2021). However, effective implementation requires meaningful assessment activities rather than routine compliance-based exercises (Alonzo & Resurreccion, 2023; Wiliam, 2021).

International assessments have identified persistent reading literacy difficulties among Filipino learners, particularly in higher-order comprehension and critical evaluation (Bernardo & Mante-Estacio, 2023; Toledo et al., 2025). Philippine secondary classroom assessments may also remain concentrated on factual recall and literal comprehension rather than analytical reasoning (Abejuela et al., 2023; Estacio & Bernardo, 2024). In TNCT, conventional assessments may prioritize basic definitions over interpreting complex social systems and evaluating evidence (Deoduco et al., 2024). These challenges establish the need to examine PISA-style formative assessments as an instructional approach at Dolores National High School.

The study integrated PISA reading literacy dimensions with formative assessment principles. Critical reading literacy was assessed through locating information, understanding and interpreting, and reflecting and evaluating across diverse textual formats (Delgado & Salmerón, 2023; Ingram, 2022). Formative assessment provided the instructional basis through continuous feedback and evidence-based instructional adjustments (Heritage & Popham, 2021; Yan et al., 2021; Wiliam, 2021). Using a pre-test and post-test design, the study examined changes in students' critical reading performance following the integration of PISA-style formative assessments into TNCT instruction.

Despite growing recognition of formative assessment, limited empirical evidence specifically addresses the integration of PISA-style reading tasks into Senior High School Social Science instruction (Bonganciso, 2021; Cabigao, 2024). This study addressed the gap by assessing students' critical reading literacy before and after the intervention across three cognitive dimensions and determining whether a significant difference existed between pre-test and post-test scores. The findings were also intended to inform the development of an instructional framework, reading module, or assessment guide for improving critical reading instruction (Corpuz & Macaraan, 2025; Flores & Santos, 2024).

The study primarily supports SDG 4 (Quality Education) by emphasizing higher-order literacy development, meaningful learning outcomes, and continuous instructional improvement. It also relates to SDG 16 (Peace, Justice, and Strong Institutions) through the development of critical evaluation and evidence-based reasoning competencies relevant to informed civic participation. These connections highlight the educational and social relevance of strengthening critical reading literacy.

The study contributes to educational sustainability by examining formative assessment practices that may strengthen critical reading instruction and support curriculum improvement. Its social relevance lies in developing students' abilities to evaluate information, interpret societal issues, and make informed judgments. Institutionally, the findings may guide Dolores National High School in developing sustainable instructional resources and assessment strategies that promote critical literacy and continuous educational improvement.

2. Material and methods

2.1 Research Design

A quantitative quasi-experimental pretest/post-test design was utilized to determine changes in students' critical reading literacy following the integration of PISA-style formative assessments. Intact classroom groups were maintained because reorganizing existing classes was impractical within the public school setting (Creswell, 2014). The design involved control and experimental groups, with assessments administered before and after the intervention to evaluate students' performance across three cognitive reading dimensions.

2.2 Locale of the Study

The study was conducted at Dolores National High School during the academic year 2025–2026. It focused on Senior High School students enrolled in the Humanities and Social Sciences (HUMSS) Strand, particularly those taking TNCT, a subject emphasizing critical analysis of societal trends, interconnected networks, and contemporary issues.

2.3 Respondents of the Study

The respondents comprised 79 Senior High School HUMSS students, consisting of 38 students in the control group and 41 in the experimental group. Participants were officially enrolled in the selected TNCT classes, regularly attended instructional activities, and participated in both the pre-test and post-test assessments.

2.4 Sample and Sampling Procedure

Purposive sampling was employed to select intact HUMSS sections taking TNCT. The selection considered students' enrollment in the designated subject, regular class attendance, and participation in both assessment periods. Maintaining existing classroom groups allowed the intervention to be implemented within the school's regular instructional arrangements.

2.5 Research Instrument

The study utilized a researcher-developed 50-item Critical Reading Literacy Assessment based on the Programme for International Student Assessment (PISA) framework and contextualized within the competencies prescribed under DepEd Order No. 42, s. 2016. The instrument assessed three cognitive dimensions: locating information, which measured the retrieval of relevant textual details; understanding and interpreting, which evaluated integration of ideas and inferential comprehension; and reflecting and evaluating, which examined students' ability to critically assess textual content, authorial intent, and ideological biases. The instrument underwent content validation by educational experts, master teachers, and literacy specialists (Lawshe, 1975). Pilot testing was conducted among non-participating Senior High School students to examine internal consistency and refine item discrimination before actual administration (Cohen et al., 2013).

2.6 Data Gathering Procedure

Data gathering followed three sequential phases, as presented in Figure 1. The first phase involved administering a 50-item critical reading pre-test under controlled classroom conditions to establish students' baseline competencies in locating information, understanding and interpreting, and reflecting and evaluating. The second phase involved integrating PISA-style formative assessments into TNCT instruction over a multi-week period. Students engaged in authentic reading tasks involving data matrices, infographics, and contrasting policy texts rather than conventional factual-recall exercises. Continuous diagnostic feedback was provided after each formative task to support students' progression from basic information retrieval toward inferential reasoning, critical evaluation, and pattern analysis. The third phase involved administering a parallel post-test following the intervention. The assessment maintained the pre-test's structural organization, cognitive distribution, and difficulty levels to evaluate changes in students' critical reading literacy.

2.7 Data Analysis Techniques

Students' pre-test and post-test results served as the basis for examining critical reading literacy across the three cognitive dimensions: locating information, understanding and interpreting, and reflecting and evaluating. The assessment results were intended to establish baseline and post-intervention performance and determine changes associated with the integration of PISA-style formative assessments. The study also sought to examine differences between pre-test and post-test scores and use the findings to inform the development of an instructional framework, reading module, or assessment guide for improving critical reading instruction.

3. Results and Discussion

3.1 Critical Reading Literacy Performance Across Cognitive Dimensions

3.1.1 Locating Information

The control group ($n = 38$) obtained pre-test and post-test mean scores of 6.53 and 6.71, respectively, representing a 0.18-point increase. Meanwhile, the experimental group ($n = 41$) improved from 6.56 to 11.61, registering a 5.05-point gain out of 15 possible points. The greater improvement in the experimental group suggests that PISA-

style formative assessments supported students' ability to retrieve relevant information from complex texts, particularly infographics and data matrices. This finding highlights the instructional value of authentic reading tasks in developing information retrieval competencies beyond conventional factual-recall activities.

3.1.2 Understanding and Interpreting

The control group's mean increased from 8.51 to 8.73, while the experimental group's mean increased from 8.51 to 15.61 out of 20 possible points. The experimental group demonstrated the largest improvement in this cognitive dimension, whereas the control group showed minimal progress. These findings suggest that continuous formative feedback supported students' ability to integrate ideas, recognize thematic relationships, and develop inferential reasoning. Such competencies are essential in TNCT, where learners examine emerging societal trends and interpret complex sociopolitical patterns. The limited progress of the control group further suggests that conventional assessments may provide insufficient opportunities for higher-order comprehension development.

3.1.3 Reflecting and Evaluating

The control group recorded a slight increase from 5.53 to 5.71, equivalent to 0.18 points. In contrast, the experimental group's mean increased from 5.56 to 11.61, representing a 6.05-point improvement out of 15 possible points. The substantial improvement suggests that structured PISA-style tasks and formative feedback supported students' ability to evaluate textual arguments, examine authorial intent, and identify ideological biases. Exposure to multiple perspectives and authentic reading materials may therefore strengthen critical evaluation skills relevant to Social Science education and informed civic participation.

3.2 Overall Critical Reading Literacy Performance

The overall 50-item assessment showed comparable baseline performance between the control group ($M = 20.5$, $SD = 3.6$) and experimental group ($M = 20.8$, $SD = 3.6$), with no statistically significant initial difference reported ($p > 0.05$). Following the intervention, the control group obtained a mean of 21.1 ($SD = 3.3$), while the experimental group achieved 38.8 ($SD = 3.6$). The study reported a highly significant post-intervention difference ($p < 0.01$). The findings indicate that students exposed to PISA-style formative assessments demonstrated substantially greater improvement than those in the control group. The results suggest that continuous diagnostic feedback and authentic reading activities may strengthen higher-order literacy competencies more effectively than conventional instructional assessments. However, the reported statistical significance requires confirmation of the statistical procedures used.

3.3 Implications of PISA-Style Formative Assessments for TNCT Instruction

The experimental group demonstrated greater improvement across all three cognitive dimensions, with the largest absolute increase observed in understanding and interpreting, followed by reflecting and evaluating and locating information. In contrast, the control group exhibited minimal changes throughout the assessment period. These findings suggest that integrating PISA-style formative assessments into TNCT instruction may help address the gap between conventional classroom evaluation and higher-order critical reading requirements. Authentic textual materials, continuous feedback, and structured analytical activities may provide a practical foundation for developing an instructional framework, reading module, or assessment guide that strengthens critical reading literacy among Senior High School students.

4. Conclusion & Recommendations

The study demonstrated that integrating PISA-style formative assessments into the Trends, Networks, and Critical Thinking in the 21st Century (TNCT) course significantly improved students' critical reading performance ($p < 0.01$). The experimental group achieved an overall mean gain of 18.15 points, compared with only 0.54 points in the control group. Improvements were observed across three cognitive dimensions: locating information (+5.05), understanding and interpreting (+7.07), and reflecting and evaluating (+6.05). These findings highlight the effectiveness of structured, feedback-oriented assessments in strengthening students' ability to interpret complex information, analyze socio-political patterns, and critically evaluate textual content, thereby addressing gaps between traditional classroom practices and international literacy standards.

The study recommends integrating PISA-aligned formative assessments into the Senior High School Social Science curriculum, particularly in TNCT, to strengthen students' critical reading competencies. Teachers should prioritize diagnostic feedback, authentic learning materials, infographics, and complex policy texts to develop higher-order thinking skills. Schools are encouraged to adopt the instructional modules and assessment guides developed in the study and provide professional development opportunities focused on designing multidimensional assessment tasks. These measures may support the consistent development of students' information retrieval, interpretation, and critical evaluation skills.

The study was limited to evaluating the effectiveness of PISA-style formative assessments within the TNCT course, focusing specifically on three cognitive dimensions: locating information, understanding and interpreting,

and reflecting and evaluating. Consequently, the findings primarily reflect improvements in these assessed competencies and do not establish the intervention's effectiveness across other learning areas or cognitive domains. Furthermore, the reported results focused on performance differences between the experimental and control groups, without establishing the long-term retention of the acquired competencies or their transfer to other academic contexts.

5. Compliance with ethical standards

The authors acknowledge the participation of the students involved in the study and the cooperation of the participating educational institution in facilitating the research on PISA-style formative assessments in the Trends, Networks, and Critical Thinking in the 21st Century (TNCT) course. Participation was voluntary, informed consent was obtained, and participant confidentiality was maintained through the nondisclosure of personally identifiable information. The study employed non-invasive educational assessment procedures to evaluate students' critical reading competencies. Information regarding potential conflicts of interest and external funding was not provided in the available study details.

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