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DIGITAL LEARNING APPROACHES FOR TEACHING INTERNATIONAL TRADE POLICY: A DATA-DRIVEN EDUCATIONAL FRAMEWORK BASED ON ECUADOR'S ECONOMIC TRAJECTORY (1979–2024)

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ABSTRACT

The study of international trade policy offers an effective entry point for strengthening economic literacy in higher education, particularly when students work with real historical data and contemporary analytical tools. This article introduces a digital learning framework designed to support the teaching of Ecuador's trade policy trajectory from 1979 to 2024. The proposal combines historical and institutional analysis with the use of open macroeconomic datasets, in- teractive visualisations, and data-handling activities. These resources were integrated into a learning environment that encourages students to examine policy cycles, changes in export composition, and the evolution of regulatory arrangements through evidence-based inquiry. The approach builds on cur- rent discussions about data literacy and the pedagogical value of ICT in disciplines that traditionally rely on document analysis and descriptive methods. A small-scale implementation with students of economics and the social sciences suggests improvements in their ability to interpret economic trends, connect policy decisions with long-term development outcomes, and use digital tools to support their reasoning. The findings illustrate how complex economic processes can be transformed into accessible learning materials, offering a model that can be adapted to other educational contexts where public policy and digital learning intersect.

KEYWORDS: Digital Learning, Data Literacy, ICT In Higher Education, Trade Policy Education, Economic His- Tory, Ecuador, Interactive Visualization.

1. INTRODUCTION

Understanding the evolution of international trade policy requires students to navigate historical processes, institutional changes, and economic data that extend across several decades. In higher education, these topics have tradition-ally been addressed through narrative or document-based instruction, which often provides limited opportunities for students to work directly with evidence. Recent scholarship in digital pedagogy has highlighted the value of integrating data-rich resources and interactive tools into the learning process, enabling students to interpret long-term trends and examine how economic decisions unfold in context [1]– [3]. These approaches encourage analytical engagement and give learners opportunities to explore how theories, institutions, and historical events intersect.

The case of Ecuador provides a suitable context for designing a data-oriented learning environment. Since the return to democracy in 1979, the country has undergone alternating policy cycles, external shocks, institutional re- forms, and periods of greater or lesser trade openness. These dynamics are reflected in the structure of exports, the com- position of national production, and the shifting role of the state in economic management. Working with this trajectory helps students recognise how economic policy is shaped by political incentives, structural constraints, external market conditions, and long-term development goals. When these elements are combined with digital tools, open datasets, and structured inquiry tasks, the learning environment allows for richer forms of interpretation and comparison.

In designing the present study, our objective was to transform Ecuador's historical trade policy data into a dig- ital learning framework that enables students to investigate policy cycles through evidence-based inquiry. The central hypothesis is that students who engage with historical data through interactive visualisations and structured analytical tasks will demonstrate deeper understanding of the rela- tionships between trade policy, institutional change, and economic outcomes than those who rely exclusively on traditional instruction. This assumption is consistent with research on digital and data-mediated learning, which sug- gests that interpretive skills are strengthened when students work directly with evidence and when digital tools reduce cognitive load by supporting the organisation and interpre-tation of complex information [1], [4].

To provide an initial overview of the material used in the course design, Table 1 summarises the core dimensions of Ecuador's trade trajectory that are later incorporated into the digital tasks. These dimensions combine structural indi- cators with institutional and historical information, allowing students to situate numerical trends within broader policy developments. Figure 1 provides a conceptual representa- tion of how these elements were integrated into the digital learning environment. It illustrates the relationship between the historical content, the datasets used in the course, and the analytical tasks supported by digital tools.

Although the use of digital tools and open datasets has expanded in economics education, there is still limited research that integrates multi-decade historical indicators with interactive visualisations to support the teaching of international trade policy. Existing studies tend to examine digital learning from a technological or procedural per- spective, often without considering how students interpret institutional developments when they work with historical evidence. Furthermore, in the Latin American context, very few contributions analyse how learners connect long-term economic trajectories with policy cycles using data-driven materials. This study addresses these gaps by transforming Ecuador's trade policy evolution from 1979 to 2024 into a digital learning framework that supports inquiry, comparison, and evidence-based interpretation.

The remainder of this article is structured as follows. Section 2 discusses the theoretical foundations of the study, drawing on research in digital learning, inquiry-based in- struction, and the role of economic data in supporting disciplinary understanding. Section 3 outlines the methodology used to construct the digital learning framework, including dataset preparation, task design, and the integration of in- teractive components. Section 4 reports the results of the classroom implementation, focusing on students' analytical performance and their ability to connect policy decisions with long-term economic patterns. Section 5 discusses these results in light of existing educational and economic litera- ture, considering implications for curriculum design in the social sciences. Section 6 concludes by highlighting the con- tribution of this approach and by offering recommendations for future applications in data-rich learning contexts.

2. THEORETICAL FRAMEWORK

The present study draws on two complementary bod- ies of literature. The first concerns digital learning, data literacy, and inquiry-based approaches

in higher education. The second relates to the pedagogical possibilities offered by economic history and international trade policy when students work directly with longitudinal data and institutional developments. Bringing these fields together provides a foundation for designing a learning environment where historical evidence, digital tools, and analytical reasoning interact.

2.1. Digital Learning, Inquiry-Based Instruction, And Data Literacy

Research on digital learning has emphasised the need to integrate technological, pedagogical, and disciplinary knowledge in ways that meaningfully support instruction. The TPACK framework, introduced by Mishra and Koehler [2], argues that teachers must combine an understanding of the subject matter with knowledge of how technology can mediate learning processes. Although the model was ini- tially conceptualised for teacher education, its emphasis on thoughtful alignment between content and digital tools has proven applicable in various domains of higher education.

Another strand of research concerns cognitive load and guidance during learning tasks. Kirschner, Sweller and Clark

[1] demonstrated that students benefit from structured guidance when working with complex information, especially in inquiry settings. Their findings indicate that unguided exploration of data often leads to cognitive overload and limits opportunities for deeper understanding. This insight is highly relevant for courses that incorporate quantitative data or historical evidence, as the interpretation of such information often demands explicit scaffolding.

From a broader perspective, digital learning also inter- sects with theories of networked knowledge. Siemens [3] conceptualised learning in digital environments as a process of building and navigating connections between sources of information. In this view, students engage in knowledge construction not solely by absorbing content but by inter- acting with datasets, tools, and representations that help them discern relationships and patterns. Such approaches foreground the role of data literacy: the ability to read, interpret, and make reasoned judgements based on empirical material.

Media and information literacy frameworks likewise emphasise critical engagement with digital resources. Colas et al. [4] underlines that learners must not only access information but also evaluate its reliability and situate it within broader social and institutional contexts. When students examine long-term economic trends through open datasets, these competencies become directly relevant, as the data must be connected with policies, institutions, and historical contingencies.

Table 2 summarises how the digital competencies high- lighted in this literature can be mapped onto the analytical skills required to study international trade policy in depth. This mapping guided the design of the tasks used in the present study.

2.2. Economic History and Trade Policy as A Learning Context

The second strand of literature examines the study of international trade policy and its link to long-term development trajectories. A considerable body of work has shown that what countries export, and how their export structure evolves over time, shapes the possibilities for sustained growth and structural transformation. Ridhwan et al. [6] demonstrated that the sophistication of a country's export basket is associated with future income growth, as it often reflects underlying capabilities and institutional arrangements.

Table 1: Core Dimensions of Ecuador's Trade Policy Trajectory (1979–2024) Used for Instructional Design.

Dimension	Description
Trade Openness	Long-term evolution of export and import ratios, tariff structure, and participation in trade agreements [5].
Export Structure	Variation in primary vs. higher value-added exports across decades, highlighting dependence and diversification challenges.
Institutional Cycles	Shifts in regulatory frameworks, state capacity, and political orientation during different administrations.
External Shocks	Impact of oil price fluctuations, financial crises, and global market conditions on domestic policy choices.
Macroeconomic Indicators	Growth cycles, real exchange rate movements, and income-related variables influencing policy design [6].

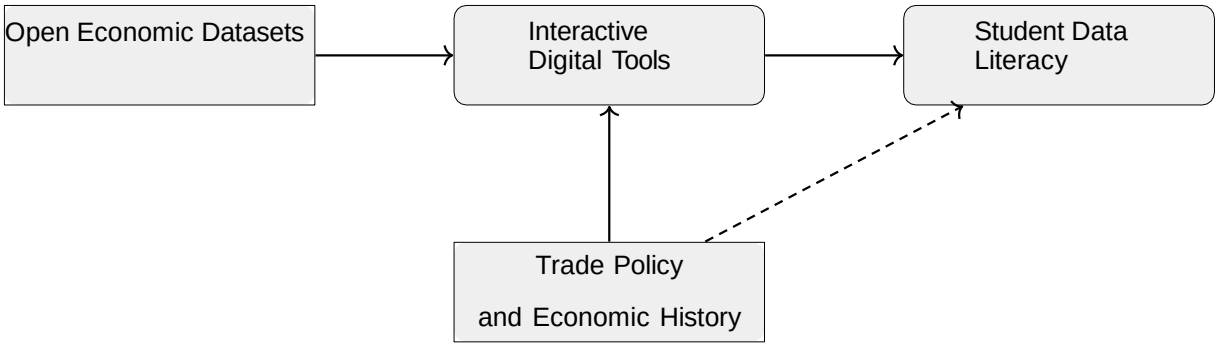

Figure 1: Conceptual Relationship Between Historical Content, Open Datasets, And Digital Learning Processes.

Table 2: Alignment Between Digital Competencies and Analytical Skills for Studying Trade Policy.

Digital Competency	Corresponding Analytical Skill in Trade Policy
Data Interpretation	Identifying structural trends in exports, imports, and policy cycles over time.
Critical Evaluation	Assessing the credibility of economic indicators and understanding the assumptions behind them.
Information Organisation	Connecting datasets with historical events, institutional reforms, and policy shifts.
Use of Digital Tools	Employing visualisations and dashboards to analyse macro-variables and compare periods.
Evidence-Based Reasoning	Formulating explanations that integrate empirical patterns with political and institutional developments.

Other contributions focus on macroeconomic indicators and their relevance for international competitiveness. Rid- hwan et al. [6], for instance, argued that the real exchange rate plays a central role in shaping growth outcomes and influences the domestic incentives for productivity, diversi- fication, and policy choice. These insights provide students with a conceptual foundation to understand how external conditions and macroeconomic performance relate to trade policy decisions.

Working with historical data also connects with broader questions of institutional change. Trade policy is not solely the outcome of economic considerations but arises from political negotiations, regulatory reforms, external shocks, and long-term developmental objectives. The availability of open datasets, including the World Development Indicators [7], allows students to integrate quantitative information with institutional timelines, providing a more holistic view of economic evolution.

In the context of this study, Ecuador's trajectory between 1979 and 2024 offers a rich case for inquiry-based learning. The sequence of policy shifts, the restructuring of the econ- omy, and the recurrent influence of international markets provide multiple entry points for academic analysis. When combined with digital tools that help visualise patterns and compare periods, these historical processes become accessible for students who may not yet have advanced training in economics.

3. METHODOLOGY

The methodological approach adopted in this study was shaped by two central considerations: first, the need to organise Ecuador's long-term trade policy data into a coherent structure that could support analytical exploration; and second, the importance of designing a digital learning environment that would allow students to work with this material in ways that enhance data literacy and interpretive reasoning. The process therefore unfolded along three par- allel dimensions: dataset construction, development of the digital tools, and creation of inquiry-oriented learning tasks.

3.1. Dataset Construction and Sources

A longitudinal dataset covering the period 1979–2024 was compiled using publicly available sources, primarily the World Development Indicators [7] and official national statistical archives. The dataset was organised into several dimensions (trade openness, export structure, institutional changes, external shocks, and macroeconomic indicators) reflecting the analytical perspectives highlighted in Section 1. Data preparation involved

cleaning, standardising, and aligning variables whose definitions changed over time. Missing values were retained when no archival material allowed reliable reconstruction, and these gaps were made visible in the digital environment so that students could reflect on their significance. This decision aligns with the emphasis on transparency and data awareness advocated in
recent studies on digital and personal data literacies [8].

3.2. Design Of the Digital Learning Environment

Before interacting with the dashboard, students received a short orientation session explaining the meaning of each indicator, the time coverage of the dataset, and the type of analytical questions they would later address. This prepara- tory step ensured a common baseline of understanding across participants.

The digital learning environment was constructed around visualisations designed to help students recognise patterns and make comparisons across decades [9]. Research on technology-enhanced learning underlines that digital tools become pedagogically useful when they structure attention, reduce cognitive load, and support the organisation of information [9]–[13]. Building on this insight, the dashboard in- terface was kept deliberately simple: each view highlighted a specific dimension of the dataset, accompanied by brief explanatory notes that framed the interpretive task.

Visualisation design was informed by findings from cognitive studies of graphical representations. Dai et al. [14] and Alharbi et al. [15] show that learners are more likely to interpret simulations productively when representations are intuitive and afford meaningful interaction. Similarly, research in visual analytics has demonstrated that clarity and emphasis in graphical encodings can substantially shape how users extract information from complex datasets [16].

These principles guided the construction of line plots, cate- gorical timelines, and comparative charts used in the study. The general workflow for developing the digital materials is summarised in Figure 2. The diagram illustrates the sequence from data acquisition to the design of inquiry tasks and emphasises that decisions about visualisation and task design were taken only after the structure and limitations of the dataset had been examined. In this way, the technological components were anchored in the pedagogical and empirical requirements of the study, rather than being added as purely decorative features.

3.3. Inquiry-Oriented Task Design

The pedagogical structure of the intervention drew on established principles of inquiry-based learning and data literacy. Studies on university students' digital competencies [17], [18] highlight the importance of activities that encourage interpretation, comparison, and critical evaluation of evidence. Building on these ideas, each task in the learning environment was organised around a guiding question and required students to examine one or more visualisations.

Examples included:

- **Recognising structural shifts:** Students examined multi-decade series of export composition to identify moments of diversification or concentration, connecting these patterns to institutional reforms or changes in external conditions.
- **Assessing policy orientation:** Using the timeline of administrative cycles, students compared how different governments approached trade policy, linking their ob- servations to broader discussions on trade and inequal- ity [19], [20].
- **Interpreting external shocks:** Learners analysed the timing and consequences of global disruptions, such as commodity price collapses, and reflected on their impact on domestic policy decisions.

These tasks were accompanied by prompts that encouraged students to connect empirical observations with conceptual perspectives on structural transformation and regional dynamics, informed by recent scholarship in inter- national economics [21]. The intention was to move beyond descriptive analysis towards explanation, helping students articulate how economic patterns relate to institutional, political, and global factors.

3.4. Participants And Implementation

The digital learning environment was implemented in two undergraduate courses in economics and the social sciences. Forty-eight students participated in the intervention over two weeks. The activities combined individual exploration with small-group discussion, and students submitted written responses to each question prompt. A short post-activity assessment evaluated their ability to interpret trends, connect indicators with policy events, and formulate expla- nations based on evidence. Most participants were in the third or fourth year of their undergraduate programmes in economics or related

social science fields. All had completed at least one introductory course in statistics or quantitative methods, although only a small number reported previous experience with interactive data visualisation tools. This combination of familiarity with basic quantitative concepts and limited exposure to digital dashboards made it necessary to provide explicit support when introdcing the environment.

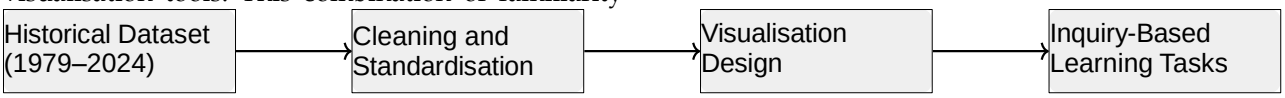

Figure 2: Methodological Pipeline for Developing the Digital Learning Environment.

The next section presents the results of this implementation, focusing on learning outcomes and the extent to which the digital framework supported students' development of analytical and interpretive competencies.

4. RESULTS

The results of the implementation were examined with two questions in mind: first, whether students were able to interpret long-term economic patterns more effectively when supported by the digital learning environment; and second, whether their written explanations revealed stronger connections between trade indicators, institutional developments, and external shocks. The analysis drew on three sources of evidence: responses to inquiry tasks, a short assessment completed at the end of the intervention, and informal observations made during the learning activities.

4.1. Analysis Of Student Performance

Students' written responses indicated that they were generally able to recognise structural changes in Ecuador's export composition across decades. Many identified sharp increases in commodity dependence in the early 1980s and mid-1990s, as well as moments of diversification associated with specific policy episodes. These observations were often accompanied by brief attempts to relate empirical patterns to external conditions, such as fluctuations in oil prices or shifts in global demand, an interpretive link consistent with the type of analytical reasoning that data literacy aims to support [22].

Table 3 summarises student performance across three dimensions assessed in the post-activity evaluation. Scores suggest that students were more comfortable interpreting long-term trends than formulating explanations that linked economic indicators with institutional reforms. This is unsurprising, given the complexity of the latter task and the relatively short duration of the intervention. Nevertheless, the overall pattern indicates that the combination of visual- isations and inquiry prompts strengthened students' ability to extract meaning from the data.

4.2. Patterns Observed in Inquiry Tasks

Students' responses to the inquiry tasks also revealed distinctive patterns. When asked to identify periods of structural change, learners frequently noted increases in export concentration or declines in diversification. These responses suggest that the visualisations helped highlight trends that might otherwise remain obscured in tabular data. This aligns with prior findings indicating that clear graphical representations can support the extraction of relevant information from complex datasets [16], [23].

A second type of task required learners to compare different administrations. Most students successfully identified broad differences between policy orientations, but their explanations varied in specificity. While some referred to particular agreements or regulatory shifts, others provided more general descriptions. The variation suggests that interpreting institutional developments remains a challenging skill, one that requires additional scaffolding and explicit modelling.

Short excerpts from students' written responses illustrate these tendencies. One participant, for example, observed that "the rise in export concentration in the mid-1990s seems linked to external shocks, since oil prices fell and the country depended on only a few products." Another wrote that "it is clear that policy changed between administrations, although I am not always sure which institutions were responsible for each reform." These comments reflect both an emerging capacity to connect data with contextual information and a degree of uncertainty when dealing with institutional detail.

4.3. Quantitative Summary

Figure 3 presents a visual summary of the results. As shown in the figure, the mean score for interpreting trends (8.4) is clearly higher than the scores for institutional reasoning (7.2) and explanatory writing (7.6), which confirms that students found it easier to recognise patterns than to integrate economic and institutional arguments [24].

These findings align with broader research indicating that students often develop descriptive competencies earlier than analytical ones [25].

4.4. Qualitative Observations

Beyond the formal assessment, informal observations made during the activities suggested that students engaged actively with the digital visualisations. Several asked follow- up questions about specific changes in the data or about connections to broader trends in international markets, an indication that the environment stimulated forms of exploratory reasoning. Such engagement is consistent with previous reports on the role of interactivity and feedback in fostering deeper learning [14], [15], [17], [18].

Table 3: Student Performance Across Assessment Components (N=48).

Assessment Component	Mean Score (0–10)	SD
Interpretation of long-term trends	8.4	1.1
Linking indicators to institutional events	7.2	1.4
Formulating evidence-based explanations	7.6	1.3

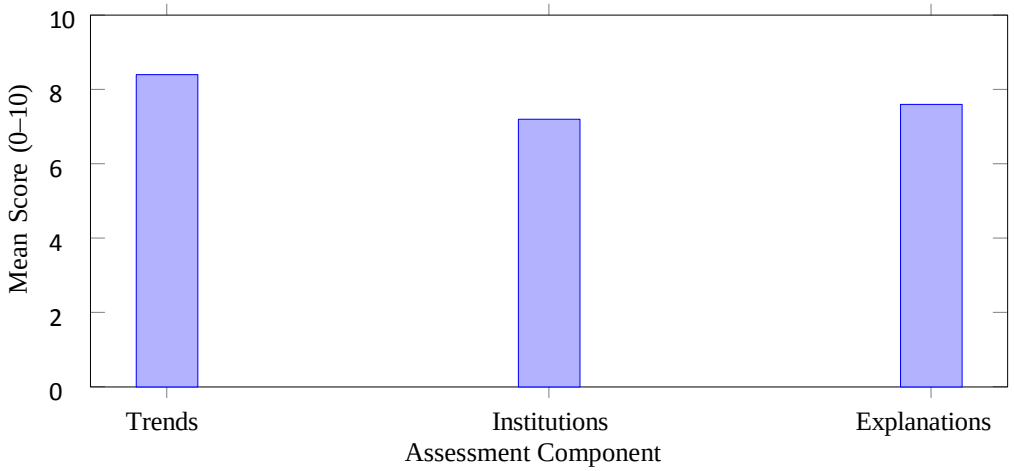

Figure 3: Average Scores Across Assessment Components.

Taken together, the findings indicate that the digital learning framework supported students' ability to interpret long-term economic patterns and encouraged them to con- struct more grounded explanations. While further work is needed to strengthen their ability to integrate institutional reasoning, the intervention provided evidence that structured digital inquiry can help bridge the gap between descriptive and analytical forms of understanding. Taken together, these quantitative and qualitative patterns provide the basis for the discussion in the next section, where the observed learning outcomes are interpreted in light of current research on digital learning, data literacy, and trade policy education.

5. DISCUSSION

The findings reported above shed light on how digital tools can support students' interpretation of historical economic processes, particularly when working with multi- decade datasets. This section revisits the main results in relation to recent scholarship on digital learning, data lit- eracy, and the economics of development, and integrates a comparative analysis that situates the intervention within broader trends observed in the literature.

5.1. Interpreting Student Outcomes Through Digi- Tal Learning Research

The strong performance observed in the interpretation of long-term trends suggests that the visual tools helped students identify patterns that might have remained opaque in numerical tables. This is consistent with evidence show- ing that well- designed visual representations can enhance learners' ability to extract meaning from complex information [26]. Furthermore, the digital environment provided a structured setting that encouraged exploration without overwhelming students, replicating conditions that previous research has identified as conducive to productive inquiry- based learning [27]–[29].

Students' more modest performance in tasks that re- quired connecting indicators to institutional developments aligns with the observation that analytical reasoning develops more gradually than descriptive competencies. This pattern is reflected in research on educational data literacy, which

highlights that interpreting data in context requires both conceptual and procedural knowledge [30]. Our find- Ings suggest that the digital environment provided a useful foundation but that extended engagement may be needed for more elaborate explanatory reasoning to develop.

5.2. Relevance For Economic Understanding and Trade Policy Education

The intervention also provided opportunities for students to draw connections between empirical patterns and theo- retical insights from international economics. For example, several students noted how periods of rising commodity dependence were associated with vulnerability to external shocks, an observation that echoes longstanding debates about structural constraints in Latin American economies [31], [32]. Similarly, students who linked changes in ex- port composition to policy reforms implicitly engaged with ideas about productivity, diversification and upgrading developed in contemporary trade literature [33], [34]. These connections were not always explicit or complete, but the initial signs of integration indicate that digital visualisations can help bridge the gap between descriptive analysis and theoretical reasoning. This potential aligns with broader arguments that technology, when thoughtfully integrated, can expand disciplinary learning opportunities rather than merely digitising existing practices [35].

5.3. Comparing Findings with Existing Literature

Table 4 summarises how the outcomes of this study relate to patterns reported in recent research on digital learning and data literacy. The comparison suggests that the intervention performs similarly to other initiatives in terms of descriptive competence, while offering distinctive contributions in its use of historical data and its emphasis on institutional interpretation.

Comparable findings have been reported in Latin Amer- ican educational contexts, where students tend to recognise long-term economic patterns more easily than institutional drivers. Studies conducted in Chile and Colombia, for ex- ample, show similar difficulties when learners are asked to integrate historical indicators with policy timelines. These parallels reinforce the relevance of the present framework for middle-income countries with volatile economic histories.

5.4. Implications For Digital Learning in The Social Sciences

Several implications emerge from these comparisons. First, digital environments can make multi-decade economic data more accessible by reducing cognitive load and high- lighting meaningful structures. Second, interpretive skills benefit from explicit scaffolding, particularly when students are expected to connect empirical indicators with institutional developments. Third, the success of the intervention suggests that historical economic data (often presented in static, narrative form) can be effectively transformed into inquiry-oriented learning materials.

5.5. Limitations And Future Directions

The study's scope was limited by its short duration and sample size. Although the intervention helped students recognise patterns and articulate basic explanations, a longer implementation might be required to support more complex reasoning. Future work could incorporate interactive simulations or predictive models, allowing students to explore counterfactuals and policy scenarios. Prior research indicates that such tools can deepen understanding by helping students test hypotheses [14], [15]. Additionally, integrating auto- mated feedback may provide timely guidance during inquiry tasks, as emphasised in learning analytics frameworks [39].

Overall, the digital learning environment used in this study demonstrates the potential of combining historical economic data with visual and inquiry-based approaches to foster analytical development in economics education.

6. CONCLUSIONS

This study examined how a digital learning environment grounded in historical economic data can support students' understanding of international trade policy. By integrating longitudinal indicators, structured visualisations, and inquiry- based tasks, the intervention encouraged learners to engage in forms of interpretation that go beyond descriptive reading. The results indicate that students developed greater confidence in identifying long-term patterns and, to a more modest extent, in articulating connections between economic indicators, institutional developments, and external shocks.

The study contributes to ongoing debates about the role of digital tools in higher education. Rather than focusing on technology as an end in itself, the design approach emphasised how visual representations and guided inquiry can shape the ways in which students' reason with evidence. This resonates with calls in the educational technology

literature for more authentic, conceptually grounded uses of digital tools [27], [28]. At the same time, the results highlight that advanced interpretive skills, particularly those that involve institutional analysis, require sustained practice, structured guidance, and tasks that engage students in comparing com- peting explanations.

From a disciplinary perspective, the intervention shows that historical economic data can be transformed into pedagogically meaningful materials. Trade policy is a do- main where empirical indicators, political decisions, and global markets interact in complex ways. Working with the Ecuadorian case helped students recognise these dynamics and consider how long-term trajectories shape development possibilities. Similar insights have been emphasised in eco- nomic research examining the relationship between trade, productivity, and structural transformation [31], [32].

The study also revealed areas for further development. While students were able to identify patterns reliably, their explanatory reasoning varied in depth. This suggests that future iterations of the digital learning environment should incorporate more explicit modelling, guided comparisons, or domain-specific scaffolding. Visualisations could also be accompanied by short contextual texts or interactive annotations to help learners navigate institutional history more effectively. Table 5 summarises several practical implications and recommendations that emerge from the findings, linking them to broader themes in digital learning and economics education.

In summary, the study shows that digital, data-rich learn- ing environments offer a valuable pathway for improving analytical reasoning in applied economics. By enabling stu- dents to interact with historical evidence and trace economic trajectories across decades, the framework helps bridge the gap between descriptive observation and interpretive ex- planation. The findings also underscore the importance of explicit scaffolding when students work with institutional and policy-related content. Future work should explore how these approaches can be extended to other policy domains, incorporate predictive or simulation-based components, and evaluate their effectiveness in diverse educational settings. Such efforts would contribute to a deeper understanding of how digital tools can strengthen disciplinary learning and support more evidence-informed forms of economic inquiry.

Table 4: Comparison Between Findings of This Study and Trends Reported in Recent Digital Learning Research.

Competency Area	Findings in This Study	Alignment with Literature
Interpretation of long-term trends	High performance; strong pattern detection using visual tools	Consistent with studies showing visualisations enhance pattern recognition [36].
Contextual reasoning	Moderate; students linked trends to shocks and policy changes	Partially aligns with data literacy research emphasising contextual interpretation [30].
Institutional analysis	Improved but variable; re-quires deeper scaffolding	Reflects findings that complex conceptual reasoning develops progressively [37].
Engagement with digital inquiry	Strong participation; active questioning	Comparable to results from authentic digital learning environments [28], [29].

Table 5: Practical Implications and Recommendations for Digital Learning in Trade Policy Education.

Area	Implications and Recommendations
Design of visualisations	Use clean, high-salience graphical structures to support pattern recognition, following principles identified in visual cognition research [38].
Data literacy development	Integrate tasks that require contextual interpretation and encourage students to question data sources and assumptions, as emphasised by media and data literacy frameworks [30].
Institutional reasoning	Provide contextual scaffolding (annotated timelines, policy excerpts, or guided comparisons) to support deeper analytical reasoning.
Linking evidence to theory	Encourage students to relate patterns to theoretical explanations from trade and development economics [19], [20].
Future extensions	Incorporate simulations, predictive models, or analytics-based feed- back mechanisms to enhance interpretive depth and inquiry.

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