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# Emerging trends in digital assessment of high school students' learning outcomes in Hanoi, Vietnam

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**Abstract**---Digital transformation is changing how student learning outcomes are assessed in secondary education. This study aims to identify emerging trends in digital assessment and examine their implications for high schools in Hanoi, Vietnam. A qualitative literature review was conducted using relevant studies identified primarily through Web of Science, Scopus, and Google Scholar. The selected literature was analyzed through thematic analysis, comparison, and synthesis. The findings identify six major trends: continuous formative assessment, platform-based assessment, digital feedback for learning, increasing student agency, data-informed teaching and learning, and more personalized assessment. These trends indicate a broader transition from digitizing conventional assessment to digitally supported assessment for learning. The review also shows that effective digital assessment requires coordinated attention to teachers' digital assessment literacy, student participation, digital infrastructure, assessment data governance, and school-level management. In the context of Hanoi, digital assessment should therefore be approached not simply as the use of technology for testing but as a pedagogical and managerial transformation. The study provides a theoretical basis for developing digital assessment practices and for further empirical research on managing student assessment in Hanoi high schools.

**Keywords**---digital assessment, formative assessment, learning outcomes, high school students, digital transformation, Hanoi Vietnam.

## 1. Introduction



Digital transformation is reshaping assessment practices in school education. Digital technologies not only replace paper-based tests but also support the collection of learning evidence, timely feedback, progress monitoring, and the use of assessment data to improve teaching and learning. This development is closely associated with the shift from assessment of learning toward assessment for learning. Formative assessment emphasizes identifying students' current performance, clarifying learning goals, and using evidence to determine subsequent learning activities (Sadler, 1989; Black & Wiliam, 2009). Assessment can therefore become an integral part of teaching rather than an activity conducted only at the end of instruction (Black & Wiliam, 2018).

Digital technologies have expanded opportunities for this transformation. Digital platforms allow teachers to design and administer assessment tasks, collect student responses, provide feedback, and analyze learning data. Dalby & Swan (2019) demonstrated that digital technology can enhance formative assessment by helping teachers identify student understanding during instruction. Digital environments also facilitate teacher-student interaction and create new opportunities for feedback (Harper, 2018; Jensen et al., 2021). Thus, digital assessment involves changes not only in assessment tools but also in how learning evidence is collected, interpreted, communicated, and used.

Several important trends are emerging. Assessment is moving from periodic testing toward continuous formative assessment, from teacher-controlled assessment toward greater student participation, and from reporting scores toward feedback and data-informed learning. Feedback is particularly important in supporting student learning (Hattie & Timperley, 2007), while digital environments can strengthen self-assessment, peer assessment, and learner agency (Casanova et al., 2021; van der Kleij et al., 2019). These developments also require teachers to possess appropriate assessment knowledge and skills. Research has identified assessment literacy, professional learning, and the ability to use assessment information as important conditions for effective assessment practices (Stiggins, 1991; DeLuca et al., 2019; Schildkamp et al., 2020).

The expansion of online learning has further accelerated these changes. Studies have documented changes in assessment tasks, evidence collection, and feedback practices in technology-supported learning environments (Cooper et al., 2022; Panadero et al., 2022). In upper secondary education, students' experiences of digital assessment depend on the quality of assessment and their opportunities to engage with feedback (Sandvik et al., 2021; Vattøy et al., 2022). These findings suggest that effective digital assessment requires both technological and pedagogical changes.

Digital assessment is also becoming increasingly relevant in Vietnam. Previous studies have addressed teachers' ICT competencies and assessment practices (Hai et al., 2016; Hai & Tinh, 2016), as well as competency-based assessment in high school education (Tinh, 2015). More recently, Phuong Thao & Thi Kim Nhung (2025) found that online formative assessment at a secondary school in Hanoi contributed to students' self-regulated learning. Nguyen et al. (2026) also demonstrated relationships among teachers' attitudes toward formative assessment policies, school support, and assessment practices in Vietnam. These

findings indicate that both teacher capacity and school support are important for changes in assessment practices.

Despite increasing attention to digital assessment, research relevant to high school education in Hanoi remains fragmented. Existing studies often focus on individual technologies, particular subjects, formative assessment, feedback, or specific educational levels. There is therefore a need to synthesize emerging trends in digital assessment and consider their implications for high schools in Hanoi.

Accordingly, this study aims to identify emerging trends in the digital assessment of high school students' learning outcomes and discuss their implications for high schools in Hanoi, Vietnam. It addresses three questions: (1) What major trends are emerging in digital assessment? (2) How do these trends change assessment practices and the roles of teachers and students?, and (3) What implications do they have for high schools in Hanoi, Vietnam? The findings are expected to provide a theoretical basis for understanding and further developing digital assessment practices in high school education.

## **2. Research Methodology**

This study employed a qualitative literature review to identify emerging trends in the digital assessment of high school students' learning outcomes. Relevant studies were identified through Web of Science, Scopus, and Google Scholar using combinations of keywords such as “digital assessment,” “online assessment,” “formative assessment,” “digital feedback,” “assessment literacy,” and “secondary education.” Priority was given to recent peer-reviewed studies related to digital assessment and secondary education, while earlier studies were included when they provided important theoretical foundations ([Jónsson et al., 2018](#)).

Studies were selected if they addressed digital or formative assessment, feedback, student participation, assessment data, or conditions for implementing digital assessment. Studies focusing mainly on technology without a clear connection to assessment, teaching, or learning were excluded. Following this selection, 27 publications were included in the review, with studies from Vietnam and Hanoi used to provide contextual evidence.

The selected studies were analyzed through thematic coding and comparison. Relevant findings were coded according to assessment practices, digital platforms, feedback, student participation, data use, and implementation conditions. Similar codes were then grouped into broader themes. This process resulted in six recurring themes, which formed the basis for the analysis presented in the following section.

## **3. Results**

### *3.1. From Conventional Assessment to Digital Assessment*

The literature indicates that digital assessment represents a broader change in both the purposes and practices of educational assessment. Conventional assessment has often focused on measuring student achievement at particular

points in time, whereas formative assessment emphasizes the continuous use of evidence to identify learning needs and guide subsequent teaching and learning (Sadler, 1989; Black & Wiliam, 2009). From this perspective, assessment becomes an integral part of the learning process rather than an activity conducted only at the end of instruction (Black & Wiliam, 2018).

Digital technologies extend this shift by changing how assessment evidence is collected, processed, communicated, and used. Digital platforms can support task administration, response collection, progress monitoring, feedback, and data analysis within the same environment. Dalby & Swan (2019) showed that digital technologies can make student understanding more visible during instruction, while digital environments can also increase opportunities for feedback and student engagement with assessment information (Jensen et al., 2021; Vattøy et al., 2022).

The reviewed literature suggests a progression from conventional assessment to digitized assessment and then to digitally supported assessment for learning. Digitization mainly changes the medium of assessment, whereas digital transformation involves changes in assessment processes, including continuous evidence collection, timely feedback, student participation, and the use of data to support instructional decisions. Therefore, digital assessment should not be understood simply as transferring conventional tests to electronic formats but as a pedagogical change supported by technology (Cooper et al., 2022; Nieminen et al., 2023).

### 3.2. Emerging Trends in Digital Assessment

The thematic synthesis identified six major trends in the development of digital assessment. These trends reflect changes in the timing and purposes of assessment, the technologies used, the role of feedback, student participation, and the use of assessment data. Table 1 summarizes these trends and their main characteristics.

Table 1. Emerging trends in digital assessment of high school students' learning outcomes

| Emerging trend                  | Main shift                                   | Key characteristics                                                                   | Representative studies                                                   |
|---------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Continuous formative assessment | Periodic assessment to continuous assessment | Ongoing evidence collection, progress monitoring, adjustment of teaching and learning | Black & Wiliam (2009, 2018); Schildkamp et al. (2020); Yan et al. (2021) |
| Platform-based assessment       | Paper-based to digital platform-based        | Online tasks, digital responses, integrated assessment activities, electronic records | Dalby & Swan (2019); Cooper et al. (2022); Panadero et al. (2022)        |
| Digital feedback                | Scores to feedback for learning              | Timely feedback, multiple feedback formats, opportunities                             | Hattie & Timperley (2007); Jensen et al. (2021); Vattøy et al.           |

| Emerging trend           | Main shift                                   | Key characteristics                                                                 | Representative studies                                                                  |
|--------------------------|----------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|                          |                                              | for improvement                                                                     | (2022)                                                                                  |
| Student agency           | Teacher-controlled to student-engaged        | Self-assessment, peer assessment, feedback engagement, self-regulated learning      | van der Kleij et al. (2019); Casanova et al. (2021); Phuong Thao & Thi Kim Nhung (2025) |
| Data-informed assessment | Reporting results using assessment data      | Progress monitoring, identification of learning gaps, instructional decision-making | Schildkamp et al. (2020); Yan et al. (2021)                                             |
| Personalized assessment  | Standardized to more personalized assessment | Flexible tasks, differentiated feedback, responsiveness to learner needs            | Jensen et al. (2021); Nieminen et al. (2023)                                            |

*Continuous Formative Assessment:* One of the clearest trends is the movement from assessment conducted at fixed points toward continuous formative assessment. Digital environments make it possible to collect evidence of student learning more frequently and integrate assessment into everyday teaching. This supports the formative purpose of identifying the gap between current and expected performance and using evidence to determine subsequent learning activities (Sadler, 1989; Black & Wiliam, 2009). However, successful implementation depends on teachers' knowledge, skills, beliefs, and ability to use assessment information effectively (Schildkamp et al., 2020; Yan et al., 2021).

*Platform-Based Assessment:* A second trend is the increasing movement from paper-based assessment toward digital platform-based assessment. Digital platforms enable assessment tasks, student responses, results, and feedback to be managed within connected environments. This can increase flexibility and provide teachers with faster access to evidence of student learning (Dalby & Swan, 2019). Experiences during remote teaching further accelerated the use of digital assessment and encouraged teachers to reconsider how assessment tasks could be designed and administered online (Cooper et al., 2022; Panadero et al., 2022).

*Digital Feedback for Learning:* Digital assessment is also associated with a shift from reporting scores toward providing feedback that supports further learning. Feedback is most valuable when it helps students understand their current performance, learning goals, and possible next steps (Hattie & Timperley, 2007). Digital environments can shorten the time between task completion and feedback and provide different formats for communicating assessment information (Jensen et al., 2021). The value of digital feedback, however, depends on whether students understand and actively use it to improve their learning (Vattøy et al., 2022).

*Increasing Student Agency in Assessment:* The literature indicates a gradual movement from predominantly teacher-controlled assessment toward greater student participation. Digital environments can support self-assessment, peer assessment, and engagement with feedback, allowing students to become active participants in assessment processes. [Casanova et al. \(2021\)](#) emphasize the potential of digital assessment to strengthen learner agency, while [van der Kleij et al. \(2019\)](#) highlight the importance of students actively interpreting and using feedback. Evidence from Hanoi also suggests that online formative assessment can contribute to students' self-regulated learning ([Phuong Thao & Thi Kim Nhung, 2025](#)).

*Data-Informed Teaching and Learning:* Another important trend is the movement from using assessment primarily to report results toward using assessment data to support instructional decisions. Digital platforms can generate records of student responses, progress, and performance over time. Such information can help teachers identify learning difficulties, monitor progress, and adjust instruction. However, the availability of data does not automatically lead to better decisions. Teachers require assessment literacy and the capacity to interpret evidence appropriately and connect it with pedagogical action ([DeLuca et al., 2019](#); [Schildkamp et al., 2020](#)).

*Toward More Personalized Assessment:* Digital technologies also create opportunities for assessment to become more responsive to differences among learners. Digital environments can support flexible tasks, differentiated feedback, and different pathways for demonstrating learning. This represents a gradual movement away from uniform assessment toward approaches that respond more closely to students' learning needs and progress. However, personalization should remain aligned with assessment purposes and educational principles. The use of digital technologies is meaningful only when it improves the quality and usefulness of assessment rather than adding technological complexity without clear pedagogical value ([Nieminen et al., 2023](#)).

#### 4. Implications for High Schools in Hanoi, Vietnam

The emerging trends identified above have several implications for high schools in Hanoi. Digital assessment requires not only technological resources but also changes in teacher competence, student participation, data use, and school-level management. Evidence from Vietnam indicates that assessment practices are influenced by both teacher-related and institutional factors ([Nguyen et al., 2026](#)), while research in Hanoi suggests that online formative assessment can support students' self-regulated learning ([Phuong Thao & Thi Kim Nhung, 2025](#)). Based on the reviewed literature, five major implications are identified in Table 2.

Table 2. Implications of digital assessment trends for high schools in Hanoi, Vietnam

| Area               | Main implication                                    | Key requirement                                         |
|--------------------|-----------------------------------------------------|---------------------------------------------------------|
| Teacher competence | Teachers assume broader roles in digital assessment | Develop digital assessment literacy and data use skills |

| Area                   | Main implication                                                  | Key requirement                                                              |
|------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------|
| Student participation  | Students become active participants in assessment                 | Promote self-assessment, feedback engagement, and self-regulated learning    |
| Digital infrastructure | Assessment increasingly depends on connected digital environments | Ensure stable platforms, accessibility, and technical support                |
| Assessment data        | Digital assessment generates continuous learning data             | Establish procedures for data collection, storage, access, and use           |
| School management      | Digital assessment requires coordinated implementation            | Strengthen planning, professional support, monitoring, and quality assurance |

First, teachers' digital assessment literacy needs to be strengthened. Teachers need to design appropriate assessment tasks, select digital tools, interpret assessment evidence, and provide useful feedback. Professional development is particularly important because effective formative assessment depends on teachers' assessment knowledge and their capacity to translate evidence into pedagogical decisions (Smith, 2011; DeLuca et al., 2019; Schildkamp et al., 2020).

Second, student participation should become an explicit component of digital assessment. Digital environments can provide opportunities for students to review their progress, use feedback, conduct self-assessment, and regulate their learning. This is particularly relevant to the Hanoi context, where online formative assessment has shown potential to strengthen students' self-regulated learning (Phuong Thao & Thi Kim Nhung, 2025). Digital assessment should therefore support students as active users of assessment information rather than only recipients of scores.

Third, digital infrastructure and platform integration need sustained attention. Effective digital assessment requires reliable access to devices, networks, and platforms that support assessment activities. Schools should avoid fragmented use of unrelated tools where possible and ensure that digital platforms are accessible, stable, and appropriate for educational purposes. Technology selection should be guided by assessment objectives rather than by technological availability alone (Nieminen et al., 2023).

Fourth, assessment data need to be systematically governed and used. Digital platforms generate substantial information about student performance and learning progress. Schools therefore need clear procedures for collecting, storing, accessing, analyzing, and using assessment data. Attention should also be given to data security, privacy, accuracy, and appropriate access. More importantly, assessment data should inform teaching and student support rather than remain as administrative records.

Finally, school-level management is essential for sustainable digital assessment. Digital assessment should not depend solely on individual teachers' initiatives. School leaders need to establish common directions, provide professional support, coordinate technological resources, monitor implementation, and ensure the quality and fairness of assessment practices. The relationship between school support and teachers' assessment practices identified in Vietnam (Nguyen et al., 2026) further suggests that institutional conditions are important for effective implementation.

These implications indicate that the development of digital assessment in Hanoi high schools requires coordinated attention to teachers, students, technology, data, and school management. These dimensions provide a practical framework for translating emerging digital assessment trends into sustainable school practices.

## 5. Discussion

The findings indicate that digital assessment should be understood as a transformation of assessment practices rather than simply the replacement of paper-based tests with electronic formats. Across the reviewed literature, the most important changes concern the purposes, timing, participants, and use of assessment. Continuous evidence collection, digital feedback, greater student participation, and data-informed decision-making extend assessment from measuring learning toward supporting learning. This interpretation is consistent with formative assessment theory, which emphasizes the use of evidence to identify learning needs and determine subsequent actions (Sadler, 1989; Black & Wiliam, 2009, 2018).

A second important finding concerns the changing roles of teachers and students. Digital technologies can automate or simplify some assessment activities, but they do not reduce the importance of teachers' professional judgment. Teachers remain responsible for designing meaningful tasks, interpreting evidence, providing appropriate feedback, and deciding how assessment information should influence instruction. This reinforces previous research emphasizing assessment literacy and professional development as essential conditions for effective assessment practice (DeLuca et al., 2019; Schildkamp et al., 2020). At the same time, students are increasingly expected to engage with feedback, monitor their progress, and participate in self-assessment. Digital assessment therefore involves a redistribution of assessment activity rather than the transfer of teachers' responsibilities to technology (Casanova et al., 2021).

The findings also highlight the growing importance of assessment data. Digital platforms can produce continuous information about student performance and learning progress, creating opportunities for more timely instructional decisions. However, greater availability of data does not automatically improve assessment. Its educational value depends on the capacity of teachers and schools to interpret and use it appropriately. This creates a closer relationship between assessment practices, digital competence, and school-level management.

For high schools in Hanoi, these findings suggest that the development of digital assessment should combine technological, pedagogical, and managerial dimensions. Existing evidence from Hanoi indicates that online formative assessment can support students' self-regulated learning (Phuong Thao & Thi Kim Nhung, 2025), while Vietnamese research highlights the relationship between school support and teachers' assessment practices (Nguyen et al., 2026). Digital assessment should therefore not be treated as an isolated initiative of individual teachers. Sustainable implementation requires professional development, appropriate digital infrastructure, clear procedures for assessment data, and coordinated support at the school level.

## 6. Conclusion

This study reviewed and synthesized emerging trends in the digital assessment of high school students' learning outcomes and considered their implications for high schools in Hanoi, Vietnam. The findings identified six major trends: the movement toward continuous formative assessment, increasing use of digital platforms, greater emphasis on digital feedback, stronger student agency, growing use of assessment data to inform teaching and learning, and the development of more personalized assessment practices. Together, these trends show that digital assessment involves changes not only in assessment tools but also in the purposes, processes, and use of assessment information.

The findings also indicate that effective digital assessment requires coordinated attention to teacher competence, student participation, technological infrastructure, assessment data, and school-level management. Teachers need appropriate digital assessment literacy to design assessment activities, interpret evidence, and provide meaningful feedback. Students should be supported to engage actively with assessment information and regulate their learning. At the school level, digital platforms and assessment data need to be managed systematically to ensure effective, fair, and sustainable assessment practices.

For high schools in Hanoi, digital assessment should therefore be approached as both a pedagogical and managerial transformation rather than simply the digitization of existing tests. The integration of assessment purposes, professional capacity, student engagement, technology, data, and school management provides a useful basis for developing digital assessment practices in the local context.

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