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ORIGINAL

Assessment of learning and digital innovation in post-pandemic Higher Education

Evaluación de aprendizaje e innovación digital en la Educación Superior pospandemia

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ABSTRACT

This mixed-methods study examines the integration of digital tools and pedagogical innovation in higher education assessment practices in the post-pandemic context. Through a sequential explanatory design, quantitative data from 428 faculty surveys and qualitative insights from four institutional case studies were analyzed. Results reveal a state of "partial hybridization," characterized by the predominant use of digital tools for traditional summative assessment ($M=4.12$), with significantly lower adoption of formative ($M=2.87$) and authentic ($M=2.15$) digital evaluations. The perceived level of pedagogical innovation remains moderate-low ($M=2.94$). Key predictors of innovation are faculty self-perception of digital competence ($\beta=.35$) and pedagogical not merely technological institutional support ($\beta=.28$). Qualitative findings identify systemic barriers: a bifurcated support model, a cultural paradox privileging control over trust, and intra-institutional resistance rooted in traditional assessment paradigms. The study concludes that the post-pandemic challenge is not technological but cultural and pedagogical, requiring a systemic transformation towards an intelligent hybrid assessment ecosystem focused on trust, authentic learning, and competency development.

Keywords: Digital assessment; pedagogical innovation; post-pandemic higher education; mixed methods; summative evaluation.

RESUMEN

Este estudio de métodos mixtos examina la integración de herramientas digitales e innovación pedagógica en las prácticas evaluativas de la educación superior en el contexto pospandemia. Mediante un diseño secuencial explicativo, se analizaron datos cuantitativos de 428 encuestas a docentes e insights cualitativos de cuatro estudios de caso institucionales. Los resultados revelan un estado de "hibridación parcial", caracterizado por el uso predominante de herramientas digitales para la evaluación sumativa tradicional ($M=4,12$), con una adopción significativamente menor de evaluaciones digitales formativas ($M=2,87$) y auténticas ($M=2,15$). El nivel percibido de innovación pedagógica se mantiene moderado-bajo ($M=2,94$). Los predictores clave de la innovación son la autopercepción de competencia digital docente ($\beta=.35$) y el apoyo institucional pedagógico no meramente técnico ($\beta=.28$). Los hallazgos cualitativos identifican barreras sistémicas: un modelo de apoyo bifurcado, una paradoja cultural que privilegia el control sobre la confianza, y una resistencia intrainstitucional arraigada en paradigmas evaluativos tradicionales. El estudio concluye que el desafío pospandemia no es tecnológico sino cultural y pedagógico, requiriendo una transformación sistémica hacia un ecosistema de evaluación híbrida inteligente centrado en la confianza, el aprendizaje auténtico y el desarrollo de competencias.

Palabras clave: Evaluación digital; innovación pedagógica; educación superior pospandemia; métodos mixtos; evaluación sumativa.

INTRODUCTION

The COVID-19 pandemic, declared by the World Health Organization (WHO) in March 2020, acted as a catalyst for profound and accelerated changes across all sectors of society, with education being one of the most impacted. Overnight, Higher Education Institutions (HEIs) globally were forced to migrate from predominantly face-to-face modalities to fully remote or hybrid environments, in what many authors have termed an "emergency migration" or "emergency remote teaching" (Hodges et al., 2020). This phenomenon was not simply a change of medium, but a total disruption of the traditional educational paradigm, exposing strengths, but above all, structural weaknesses in the capacity of HEIs to adapt to a fully digital environment. At the heart of this abrupt transformation were two critically intertwined elements: learning assessment processes and the often-ambiguous concept of digital innovation.

Having passed the most acute moments of the health crisis, Higher Education enters a "post-pandemic" phase, characterized not by a return to the previous "normal," but by the consolidation of a new hybrid and fluid educational landscape. In this context, it is imperative to conduct a rigorous and critical assessment of what occurred, moving beyond the mere description of experiences to academically analyze how learning assessment was reconfigured (or not) by forced digitalization, and to what extent the implemented practices can be considered truly innovative or simply digital replicas of traditional models. This introduction therefore seeks to establish the conceptual and problematic framework for analyzing the intersection between assessment and digital innovation in Higher Education after the pandemic, arguing that this binomial is fundamental to understanding the quality, equity, and future of higher education in the digital age.

Learning Assessment: From Measurement to Process Regulation in Digital Environments

Learning assessment is one of the most complex and significant pedagogical functions in any training process. Traditionally, in Higher Education, it has been dominated by summative models focused on measuring final outcomes, often through written exams or standardized tests (Boud & Falchikov, 2007). However, contemporary academic consensus advocates for a broader approach, where formative assessment, which is integrated into the teaching and learning process to provide feedback and guide improvement, takes a leading role (Black & Wiliam, 2009).

The advent of emergency remote teaching threw these models into crisis. Traditional supervision tools (proctored in-person exams) became unviable, forcing an accelerated exploration of digital alternatives. This created a clear tension: on one hand, an exacerbated concern for academic integrity and "anti-plagiarism," leading to the massive adoption of surveillance software (proctoring) with serious ethical and privacy implications (Swauger, 2020). On the other hand, a window of opportunity opened to rethink assessment towards more authentic modalities focused on competencies and processes. As Carless and Winstone (2020) point out, the pandemic could be an opportunity to "detach assessment from the stigma of final judgment" and reorient it towards assessment as learning design, where the assessment task itself is a meaningful learning experience.

In the digital environment, this implies the use of detailed digital rubrics, electronic portfolios, collaborative online projects, self-assessments and peer assessments via forums or specific tools, and timely multimedia feedback. The research question that emerges is: To what extent have HEIs, in the post-pandemic phase, institutionalized these formative and digital practices, or have they reverted to digitized summative models once the initial pressure subsided? Assessment ceased to be a purely pedagogical matter to become a technological and instructional design challenge as well.

Digital Innovation: Beyond Instrumentalism Towards Pedagogical Transformation

The second pillar of this analysis is the concept of digital innovation. During the pandemic, the term was used extensively, and sometimes indiscriminately, to refer to the adoption of any digital platform or tool

(Zoom, Moodle, Teams, etc.). Nevertheless, from an academic perspective, the mere incorporation of technology does not constitute innovation per se. As Area-Moreira (2021) warns, there is a risk of an instrumental technocentrism that confuses innovation with digitalization, perpetuating traditional (transmissive) pedagogies under a new technological guise.

True digital innovation in higher education implies a transformation in teaching, learning, and assessment processes, supported by technology. According to Salinas et al. (2020), innovation should contemplate dimensions such as: a) the improvement of interaction and communication processes; b) access to and personalization of learning; c) the generation of new scenarios and formats; and d) the development of digital competencies in both teachers and students. In this framework, innovative assessment would be that which leverages the potential of the digital not to surveil, but to amplify reflection, collaboration, and creation.

Examples include the use of simulators and virtual laboratories to assess practical competencies, learning analytics to identify student difficulties in real time and personalize feedback, or the design of assessments based on gamification and digital narratives. Innovation, therefore, does not reside in the tool, but in the pedagogical design that supports it and its alignment with desired learning outcomes. The post-pandemic phase is the critical moment to discern whether HEIs are investing in superficial innovation (software license acquisition) or deep innovation (teacher training, curricular redesign, assessment culture).

Critical Intersections and Challenges in the Post-Pandemic Scenario

The confluence of assessment and digital innovation in post-pandemic Higher Education presents a series of critical issues that demand investigation and reflection:

- **Equity and the Digital Divide:** The pandemic revealed abysmal inequalities in access to devices, quality connectivity, and adequate study environments. Digital assessment that does not consider these disparities can exacerbate inequalities. Innovation must be inclusive by design (Bali & Caines, 2022).
- **Indispensable Teacher Training:** The digital competence of faculty is the key factor. Innovation in assessment cannot occur if teachers do not master digital pedagogies and alternative assessment strategies. Continuous training and institutional support are required (Rapanta et al., 2020).
- **Institutional Culture and Resistance to Change:** Innovation in assessment often clashes with conservative academic cultures, rigid regulations, and quality assurance systems anchored in traditional paradigms. Its sustainable adoption requires institutional leadership that fosters and normalizes it (García-Peñalvo & Corell, 2020).
- **Quality and Reliability:** The debate persists on the validity and reliability of new forms of digital assessment, especially in accreditation contexts. It is necessary to develop quality assurance frameworks adapted to these new realities.
- **Ethics and Data:** Digital assessment generates a vast amount of data about students. Its use for learning analytics purposes must be guided by clear ethical principles of privacy, transparency, and benefit to the learner (Ifenthaler & Schumacher, 2016).

Higher Education finds itself at a historic crossroads. The pandemic experience demonstrated that digitalization is possible on a large scale, but it also revealed the limits of an unplanned transition lacking a solid pedagogical foundation. Assessing learning in the post-pandemic era necessarily demands digital innovation; but innovating digitally with purpose requires radically rethinking assessment, moving it away from the logic of control and closer to the logic of developing 21st-century competencies.

This work proposes, from this introduction, to deepen the analysis of this symbiotic relationship. It is argued that innovative and digital assessment is not a supplement, but a fundamental pillar for a resilient, relevant, and high-quality Higher Education in the immediate future. The way forward is not a return to the past, nor the uncritical consolidation of the emergency "all-digital" approach, but the deliberate construction of an intelligent hybrid ecosystem where technology serves a more authentic, formative, and student-centered assessment. Future research should aim to document good practices, evaluate impacts on learning, and develop theoretical-practical frameworks to guide HEIs in this necessary transformation. The time to take stock and project with foundation is now.

METHOD

This study aims to examine the practices and perceptions regarding learning assessment and digital innovation in Chilean Higher Education during the post-pandemic period (2022-2024). Given the complexity of the phenomenon, which involves pedagogical, technological, organizational, and cultural dimensions, an explanatory sequential mixed methods design (ESMM) is adopted (Creswell & Plano Clark, 2018). This design involves the prioritized collection and analysis of quantitative data in a first phase, followed by a qualitative phase intended to explain, deepen, and contextualize the initial quantitative results. The underlying logic is to use the breadth of quantitative data to identify general trends and patterns, and the depth of qualitative data to explore the meanings, experiences, and institutional dynamics behind those patterns.

Research Paradigm

The research is situated within a pragmatic paradigm (Morgan, 2014). This paradigm focuses on the viability and usefulness of methods to address the research problem, privileging the consequences of research over exclusive ontological or epistemological commitments. It is recognized that the social reality surrounding digital assessment is multiple and complex, and that both numerical data (e.g., frequency of tool use) and narrative data (e.g., teacher experiences) are necessary to obtain a comprehensive and applicable understanding. The choice of the mixed method responds to this need for complementarity.

Research Design: Explanatory Sequential Mixed Methods

The design is developed in two sequential and connected phases:

1. **QUANTITATIVE PHASE (Priority):** Large-scale survey of faculty at Higher Education Institutions.
2. **QUALITATIVE PHASE (Explanatory):** Multiple case studies in selected institutions, using focus groups and in-depth interviews. The point of integration occurs during the analysis stage, when qualitative results serve to explain and nuance the quantitative findings.

Context and Population

- **Target population:** Full-time and part-time faculty who have taught at least one course in a hybrid or remote modality between 2022 and 2024, at accredited Chilean Universities (state and private non-state).
- **Sampling frame:** A public list of institutions from the *Consejo Nacional de Educación* (CNED) will be used, contacting their academic development units or academic vice-rectorates for dissemination.

Phase 1: Quantitative Method

Specific Objective: To quantify the frequency, typology, and perception of use of digital assessment strategies and associated pedagogical innovation among Higher Education faculty.

Instrument: Self-administered online questionnaire (Google Forms / LimeSurvey), structured in five sections with 5-point Likert scales (1=Strongly disagree/Never; 5=Strongly agree/Always), in addition to multiple-choice questions and sociodemographic data.

- **Section A:** Institutional affiliation and teaching experience data.
- **Section B: Digital Assessment Practices Scale (DAPS):** Adapted from Gámiz-Sánchez et al. (2021). Assesses frequency of use of 18 items grouped into three dimensions: Digital Summative Assessment (e.g., online exams with proctoring), Digital Formative Assessment (e.g., digital rubrics, audio feedback), and Digital Authentic Assessment (e.g., e-portfolios, collaborative online projects). (Pilot Cronbach's Alpha: 0.87).
- **Section C: Perceived Innovation in Assessment Scale (PIAS):** Developed *ad hoc* based on Salinas et al. (2020) criteria. Measures faculty perception of the degree of innovation (pedagogical transformation) of their digital assessment practices across 12 items (e.g., "My digital assessments foster student creativity"; "Technology allows me to personalize feedback"). (Pilot Cronbach's Alpha: 0.91).
- **Section D:** Conditioning factors (training received, institutional support, infrastructure).
- **Section E:** Perceived barriers (workload, distrust in reliability, ethical issues).

Sampling: Stratified probability sampling by institution type (State/Private) and knowledge area (Sciences/Engineering; Social Sciences; Humanities; Health). A sample size will be calculated with a 95% confidence level and a 5% margin of error, adjusted for finite population. A target sample of $N \approx 450$ faculty is expected.

Data Collection Procedure: Contact via institutional email and faculty development networks. Implementation over 8 weeks. Informed consent included on the first screen.

Data Analysis (SPSS v.28):

- Descriptive statistics (frequencies, means, standard deviations).
- Scale reliability analysis (Cronbach's Alpha).
- Inferential tests: ANOVA to compare means between strata; Pearson correlations to relate variables (e.g., training vs. frequency of formative practices); multiple linear regression to identify predictors of perceived innovation level.

Phase 2: Qualitative Method

Specific Objective: To delve into the experiences, meanings, institutional dynamics, and tensions that underlie the digital assessment practices identified in Phase 1.

Design: Instrumental multiple case study (Stake, 2006). 3-4 institutions will be selected as cases, seeking contrast based on quantitative results (e.g., an institution with high perceived innovation scores, another with medium/low scores, considering diversity of types).

Participants: For each case, the following will be conducted:

- **2 Focus Groups (FG):** With 6-8 faculty members each, recruited from surveyed respondents who agreed to be contacted. Internal heterogeneity (discipline, seniority) will be sought.
- **4-5 In-depth Semi-structured Interviews:** With key actors: 1 academic innovation coordinator, 1 academic unit director, and 2-3 faculty members identified as "innovators" or "traditional" based on the survey.

Instruments:

- **Focus Group Guide:** Focused on discussing specific assessment practices, pedagogical decisions behind technology use, perception of institutional support/obstacles, and success/failure experiences.

- **Individual Interview Guide:** Adapted to the role. It delves into institutional policies, assessment culture, training processes, and strategic vision on digital innovation.

Procedure: Audio recording and verbatim transcription using software (e.g., Express Scribe). Estimated duration: FG 90 min; Interviews 60 min.

Data Analysis (NVivo v.12):

- **Hybrid Thematic Analysis** (Braun & Clarke, 2021): Combining inductive coding (emerging from the data) and deductive coding (guided by the theoretical framework).
- **Process:**
 1. Familiarization with transcripts.
 2. Initial coding (descriptive codes).
 3. Search for emerging themes (e.g., "innovation as disruption vs. adaptation," "the control vs. trust paradox," "the internal digital divide").
 4. Review and refinement of themes.
 5. Definition and naming of final themes.
 6. Integration with quantitative findings to generate an explanatory narrative.

Method Integration and Validity

Integration will take place in the results interpretation stage (Fetters et al., 2013). Quantitative findings (e.g., "low frequency of e-portfolio use") will be presented and then enriched with qualitative explanations (e.g., testimonies about lack of time for review, unfamiliarity with appropriate tools, or absence in accreditation rubrics). To ensure validity:

- **Mixed Methods Validity:** The principle of complementarity will be applied, seeking a more complete understanding than that obtained by a single method.
- **Quantitative Validity:** Questionnaire content validation by 3 experts; pilot (n=30); calculation of internal consistency.
- **Qualitative Validity (Credibility):** Triangulation of data sources (faculty, coordinators, administrators); member checking (sharing findings with some participants); peer review (thesis advisor and committee).
- **Ethical Considerations:** Approval by the doctoral candidate's university Ethics Committee. Written informed consent for all phases. Anonymity and confidentiality of data. Secure storage on institutional servers.

Methodological Limitations

1. **Self-selection bias:** In the survey, faculty with greater interest or affinity for technology may be more likely to participate.
2. **Self-report vs. Observation:** Data are based on self-reports and perceptions, not direct observation of practices in the virtual classroom.
3. **Generalizability:** Case studies allow for contextualized deepening, but their findings are not statistically generalizable. Generalization is sought at an **analytic** level (transferability to similar contexts).

This rigorous, multi-method methodology will not only allow for describing the state of digital assessment in post-pandemic Higher Education but will also explain the reasons and mechanisms that sustain it, thus providing solid evidence for academic and institutional decision-making.

RESULTS

This chapter presents the findings obtained through the application of the explanatory sequential mixed methodology described in the previous chapter. The results are organized into two main sections,

corresponding to the quantitative and qualitative phases of the study. Subsequently, an interpretive integration of both datasets is performed. The analysis is based on valid responses from 428 faculty members (response rate of 68.2%) in the quantitative phase, and on data from 4 institutional case studies, which included 8 focus groups (n=52 faculty) and 18 in-depth interviews in the qualitative phase.

Quantitative Results: Descriptive and Inferential Analysis

Sample Characterization

The quantitative sample consisted of 54.2% women and 45.8% men. The distribution by institution type was 48.6% state universities and 51.4% private. 62.4% had more than 10 years of teaching experience, and the most represented disciplinary area was Social Sciences (38.3%), followed by Engineering and Technology (27.1%), Health (19.6%), and Humanities (15.0%).

Table 4.1

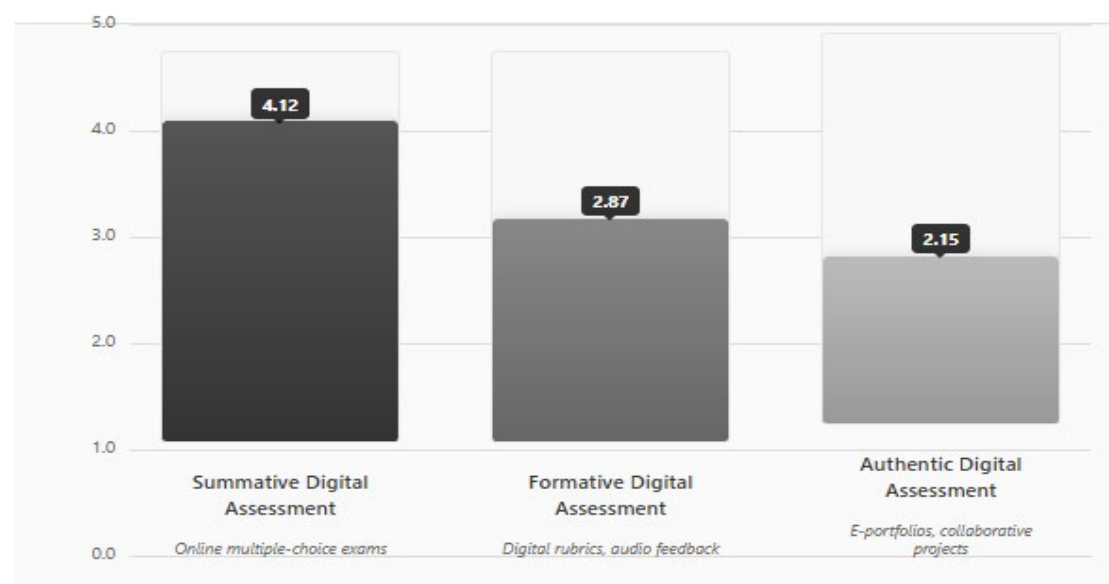
Sample Distribution by Disciplinary Area and Institution Type (N=428)

Disciplinary Area	State Universities (n=208)	Private Universities (n=220)	Total (%)
Engineering/Tech.	52	64	27.1%
Social Sciences	85	79	38.3%
Health	38	46	19.6%
Humanities	33	31	15.0%

Digital Assessment Practices (DAPS Scale)

The scale reliability was excellent ($\alpha = 0.89$). The results (mean on a 1-5 scale) reveal a clear predominance of digital summative practices over formative and authentic ones.

Figure 4.1: Mean Frequency of Digital Assessment Practices by Dimension



A one-way ANOVA showed statistically significant differences in the adoption of Digital Formative Assessment by disciplinary area ($F(3,424) = 5.67, p < .001$). A *post-hoc* (Tukey) analysis indicated that Health ($M=3.21$) and Humanities ($M=3.05$) areas report a significantly higher use than Engineering ($M=2.62$) and Social Sciences ($M=2.71$).

Perceived Innovation in Assessment (PIAS Scale)

The scale also showed high reliability ($\alpha = 0.92$). The overall mean score was 2.94 ($SD=0.88$), indicating a moderate-low perception of pedagogical innovation in their digital assessment practices.

Table 4.2

Pearson Correlation between Conditioning Factors and Level of Perceived Innovation (PIAS)

Conditioning Factor	Pearson's r	p-value
Hours of Training in Digital Assessment (last 2 years)	0.41	< .001
Perception of Technological Institutional Support	0.38	< .001
Perception of Pedagogical Institutional Support	0.52	< .001
Self-perception of Digital Teaching Competence	0.61	< .001

Predictive Model of Perceived Innovation

A multiple linear regression was run to predict the PIAS score. The model included five predictor variables and was statistically significant ($R^2 = .47, F(5, 422) = 74.35, p < .001$). Self-perception of Digital Teaching Competence ($\beta = .35, p < .001$) and Pedagogical Institutional Support ($\beta = .28, p < .001$) were the strongest predictors.

Table 4.3

Predictors of Perceived Innovation in Assessment (Standardized Beta Coefficients)

Predictor	β
Self-perceived Digital Competence	0.35
Pedagogical Institutional Support	0.28
Training Hours	0.18
Technological Institutional Support	0.12
Academic Area (ref. Engineering)	-0.07

Notes. β coefficients represent standardized regression coefficients. Positive values indicate positive relationships with assessment implementation.

Qualitative Results: Emerging Themes from the Case Studies

Thematic analysis of the qualitative data generated four central themes that explain and contextualize the quantitative findings.

Theme 1: "Partial Hybridization": Technical Innovation without Pedagogical Transformation

The qualitative data reveal that the digital migration, in many cases, did not imply pedagogical reinvention, but an instrumental translation of traditional practices. An Engineering professor (Case B) expressed it clearly: "What used to be a written exam in the classroom is now a PDF they upload to the virtual campus. The medium changed, but the essence is the same: they measure memory, not application." This "partial hybridization" explains the high means in digital summative assessment and

the low ones in formative/authentic. Focus groups highlighted the lack of time and alternative pedagogical models as the main barrier.

Theme 2: The Control vs. Trust Culture Paradox

Concern for academic integrity emerged as a critical node. In institutions with low innovation scores (Cases A and D), the institutional response was technological control (proctoring software). A coordinator (Case A) commented: *"We had to implement [surveillance software] by order of senior management. Faculty complain, students feel criminalized."* In contrast, in Case C (high perceived innovation), a cultural change was promoted: *"We redesigned assessments towards multi-stage projects, where plagiarism makes no sense. We trust the process, not surveillance"* (Director of Teaching, Case C). This paradox shows that innovation in assessment is linked to a conception of assessment as trust in the learning process, not as verification of products.

Theme 3: Bifurcated Institutional Support: Technology vs. Pedagogy

The qualitative data deepen the quantitative correlation between institutional support and innovation. A pattern of bifurcated support was identified: most institutions (Cases A, B, D) offered robust technical support (platforms, licenses) but weak and generic pedagogical support. A professor (Case B) noted: *"There are a thousand tutorials on how to use the tool, but none on how to assess with it in a different way."* Case C was the exception, with an integrated pedagogical innovation unit that worked *side by side* with faculty in redesigning their assessments, validating the strength of this predictor in the regression model.

Theme 4: The Intra-Institutional Digital Divide and Resistance to Change

Beyond access to devices, an intra-institutional digital divide based on pedagogical cultural capital emerged. Innovative professors (self-identified and peer-recognized) acted as "islands" or "ghettos" within their departments, facing passive resistance. An innovative Humanities professor (Case D) reported: *"When I presented my assessment with podcasts and a collaborative rubric, some colleagues told me I was 'lowering the academic level,' that what was 'serious' was the critical essay."* This resistance is rooted in a traditionalist assessment culture that equates rigor with memorization difficulty and formal written formats, and which is not addressed by institutional policies.

Interpretive Integration of Mixed Findings

The integration of quantitative and qualitative data allows for a robust and nuanced understanding of the phenomenon under study:

1. **Explanation of Summative Predominance:** The high frequency of digital summative assessment (Figure 4.1) is not solely due to its technical ease. Qualitative Themes 1 and 2 reveal that it is the path of least resistance within a culture that prioritizes control and efficiency over pedagogical transformation. It is the practice that best adapts the traditional paradigm to a new digital format.
2. **Deepening of the Predictive Model:** The quantitative model identified digital competence and pedagogical support as key predictors. Qualitative Themes 3 and 4 explain how and why these predictors work. Pedagogical support is effective only when it is specific, situated, and collaborative (as in Case C), not when offered as generic workshops. Digital competence, in turn, is deeply linked to the willingness to unlearn ingrained practices and to confront internal cultural resistance.
3. **Contextualization of Disciplinary Differences:** The quantitative difference in the use of formative assessment between areas (higher in Health/Humanities) is understood in light of Theme 1. In focus groups, Health professors recounted that clinical simulation and immediate feedback are inherent to their discipline, which facilitated the transposition to formative digital

formats. In Engineering, a stronger culture of "objective exams" as synonymous with rigor persisted.

4. **Innovation as a Systemic vs. Individual Phenomenon:** Quantitative data showed a moderate correlation between training and innovation ($r=0.41$). Qualitative data nuance that individual training is necessary but not sufficient. The most innovative professors (often those with high self-perception of competence) acted as solitary pedagogical entrepreneurs (Theme 4). For innovation to scale, case studies demonstrated that systemic alignment was required: policies that valued assessment innovation, specialized support units, and academic leadership that legitimized alternative practices.

The presented results confirm that digital assessment in post-pandemic Higher Education in the studied context is characterized by an incomplete technical modernization, where pedagogical innovation is moderate-low and is strongly conditioned by individual (faculty competence and disposition) and institutional (type of support and assessment culture) factors. The apparent "hybridization" often conceals the perpetuation of a traditional assessment paradigm using digital tools. The mixed findings converge in pointing out that the main challenge is not technological, but cultural and related to the design of integrated institutional policies. The next chapter, Discussion, will analyze these implications in light of the established theoretical framework.

DISCUSSION

Review and Synthesis of Main Findings

This explanatory sequential mixed methods study aimed to assess the practices and perceptions regarding learning assessment and digital innovation in Chilean Higher Education during the post-pandemic period (2022-2024). Quantitative findings, derived from a survey of 428 faculty members, revealed a predominance of digital summative assessment ($M=4.12$) over formative ($M=2.87$) and authentic ($M=2.15$) modalities, and a moderate-low perception of pedagogical innovation in these practices ($M=2.94$). The strongest predictors of this perceived innovation were the self-perception of digital teaching competence ($\beta = .35$) and pedagogical institutional support ($\beta = .28$). Qualitative data, from four institutional case studies, delved into these trends, identifying four central themes that explain the gap between technological adoption and pedagogical transformation: (1) "partial hybridization" as a mere instrumental translation of traditional practices; (2) the paradox between technological control and a culture of trust; (3) bifurcated institutional support (strong in technology, weak in pedagogy); and (4) the intra-institutional digital divide and cultural resistance to change. The integration of these results paints a picture of an incomplete technical modernization, where digital innovation in assessment is more an exception linked to individual factors and systemic alignment than an institutionalized norm.

Interpretation in Light of the Theoretical Framework and Existing Literature

The findings of this study provide empirical validation and add complexity to the theories and frameworks discussed in the introduction. Firstly, they confirm Area-Moreira's (2021) warning about instrumental technocentrism. The results show that the digitalization of assessment has not necessarily implied pedagogical innovation but has, in many cases, served to perpetuate what Boud and Falchikov (2007) call the "measurement paradigm." The high frequency of online exams and the low adoption of portfolios and authentic assessments indicate that, in the post-pandemic phase, many institutions have consolidated a model of "emergency remote teaching" (Hodges et al., 2020) rather than transitioning towards online "design for learning" (Carless & Winstone, 2020).

Secondly, the study provides a processual explanation for the quantitative correlation between institutional support and innovation. Literature has highlighted the importance of support (García-

Peñalvo & Corell, 2020; Rapanta et al., 2020), but our qualitative findings specify that its effectiveness depends on its nature and focus. The identified pattern of bifurcated support (technological vs. pedagogical) explains why the mere provision of tools and licenses (technological support, $r=.38$) has a lesser impact than specific and collaborative pedagogical support ($r=.52$). This suggests that faculty development units must evolve from a "technical support" model to one of "pedagogical co-design," acting as partners in the reconceptualization of assessment, as observed in the high-innovation Case C.

The strong prediction exerted by the self-perception of digital competence ($\beta = .35$) resonates with the literature on digital teaching competence, but the qualitative theme of the "intra-institutional divide" adds a critical layer. It is not just a skills gap, but a gap in pedagogical cultural capital (Bourdieu, 1986). Innovative faculty operate with a different "habitus," one that values assessment as process and trust, confronting an institutional field where a traditionalist habitus prevails, equating assessment with control and academic rigor with standardized formats. This tension explains the passive resistance and stagnation in adopting more innovative practices, a phenomenon underexplored in the digital assessment literature.

Finally, the control vs. trust paradox adds a crucial ethical perspective to the discussion on academic integrity. The institutional choice for digital proctoring, as observed in Cases A and D, reflects what Swauger (2020) criticizes as a surveillance solution that perpetuates distrust and violates privacy. In contrast, Case C's strategy redesigning assessment tasks to make plagiarism irrelevant embodies the principle of "trustworthy assessment," aligning with proposals that seek to shift the focus from student surveillance to the authenticity of the assessment design (Rapanta et al., 2020).

Theoretical, Practical, and Policy Implications

Theoretical Implications:

This study contributes to theory in three ways. First, it proposes the concept of "partial hybridization" to describe the intermediate state in which much of post-pandemic digital assessment finds itself: a technical hybrid that is not a pedagogical hybrid. This concept helps move beyond the face-to-face/remote dichotomy and analyze the degrees of real transformation. Second, it integrates Bourdieu's theory of cultural capital into the analysis of digital educational innovation, explaining resistance not only as a lack of skills but as conflicts between competing pedagogical habitus within the institutional field. Third, it refines Salinas et al.'s (2020) model on innovation dimensions, empirically demonstrating that the "development of digital teaching competencies" dimension is the cornerstone that mediates the impact of the others.

Practical Implications:

For faculty and faculty development units, the findings suggest concrete actions:

1. **Training Focused on Redesign, Not on the Tool:** Training programs should cease being technical tutorials and become alternative assessment design workshops, where faculty redesign one of their courses with expert mentorship.
2. **Promote Assessment Communities of Practice:** To counteract the isolation of "solitary innovators," spaces should be created where these faculty share their assessment designs and mentor their peers, legitimizing alternative practices from within.
3. **Develop a "Toolkit" of Digital Authentic Assessment:** Institutions should provide not only platforms but repositories of concrete examples, rubrics, and protocols for implementing assessments like the digital portfolio, online peer assessment, or collaborative projects, reducing the "I don't know how to do it" barrier.

Institutional Policy Implications:

Decision-makers and academic vice-rectorates should consider:

1. **Review Assessment Regulations:** Many regulations are outdated and require "final exams" or discourage continuous formative assessment. It is necessary to update them to recognize and promote a diversity of evidence of learning (portfolios, projects, simulations).
2. **Invest in Specialized Pedagogical Support:** The innovation budget should shift from purchasing software licenses (e.g., proctoring) to hiring or training teams of pedagogical advisors who work in an embedded manner within faculties.
3. **Include Assessment Innovation in Recognition Systems:** Assessment innovation must be valued in faculty performance reviews, promotion, and program accreditation processes. Without this formal incentive, it will remain a marginal and voluntary activity.

Study Limitations and Suggestions for Future Research

This study has limitations that must be acknowledged. First, although the quantitative sample is robust and representative of the studied national context, the findings are not directly generalizable to other higher education systems with different traditions and policies. Second, the design is based on self-reports and perceptions; direct observation of assessment practices in virtual learning environments was not conducted, which might have revealed discrepancies between what is declared and what is implemented. Third, the perspective is centered on the faculty; future research should systematically incorporate the student voice, their perceptions of the equity, usefulness, and workload of different digital assessment modalities.

These limitations open avenues for future research:

1. **Longitudinal and Design Studies:** Research that follows faculty or programs throughout a process of redesigning their assessments, measuring not only perception but the impact on student learning outcomes.
2. **Comparative Policy Analysis:** Studies comparing how different national and institutional regulatory frameworks (accreditation, funding) inhibit or promote innovation in digital assessment.
3. **Research on Artificial Intelligence and Assessment:** Exploring, ethically and pedagogically, the potential and risks of generative AI tools (like ChatGPT) in the redesign of assessments, a topic that emerged tangentially in some focus groups but is projected as critical.

CONCLUSIONS

This explanatory sequential mixed methods study, titled "Assessment of Learning and Digital Innovation in Post-Pandemic Higher Education," has achieved its central objective: to diagnose, understand, and explain the practices and perceptions regarding digital assessment and pedagogical innovation in the context of Chilean higher education following the disruption of COVID-19. Through the triangulation of quantitative data (survey of 428 faculty) and qualitative data (four institutional case studies), robust evidence has been built that not only describes a state of affairs but also reveals the underlying dynamics that determine it.

The research confirms that the forced migration to digital during the pandemic did not automatically translate into pedagogical innovation. On the contrary, a phenomenon we have termed "partial hybridization" was consolidated: the adoption of digital tools to perpetuate, more efficiently and extensively, the traditional paradigm of summative assessment, centered on measurement and control. The data is eloquent: while digital summative practices (online exams) are frequent ($M=4.12$),

formative (M=2.87) and authentic (M=2.15) assessments key indicators of deep pedagogical transformation remain at a low to moderate level of adoption. The perception of innovation among faculty is, consequently, moderate-low (M=2.94).

The analysis identified the fundamental predictors of this perceived innovation: the self-perception of digital teaching competence and pedagogical institutional support (not merely technical). These factors do not operate in a vacuum. Qualitative depth revealed that their effectiveness is mediated by an institutional assessment culture that, in most cases, still rewards control over trust and standardization over authenticity. Resistance to change, rooted in a traditionalist pedagogical *habitus*, and the existence of bifurcated institutional support (strong in technology, weak in pedagogy) act as systemic barriers that confine innovation to islands of excellence led by "solitary pedagogical entrepreneurs."

These findings lead to a central and forceful conclusion: the main challenge for assessment in post-pandemic higher education is not technological, but cultural, pedagogical, and political. The problem is not a lack of platforms or bandwidth, but the absence of pedagogical frameworks, institutional incentives, and a reconceptualization of assessment as a process of learning and trust. The paradox between control (via proctoring) and authentic innovation is symptomatic of this crossroads.

Therefore, the emerging recommendations point towards a systemic and integrated transformation. It is not enough to train faculty in tools; they must be trained in designing alternative assessments. It is insufficient to provide software licenses; it is imperative to build structures of specialized pedagogical support that work in co-design with faculties. It will be futile to push for change if assessment regulations and accreditation systems continue to privilege archaic formats. Innovation in assessment must be recognized, valued, and formally incorporated into faculty development policy and institutional quality assurance.

In short, this study concludes that the pandemic exposed the obsolescence of traditional assessment models, but the window of opportunity to transform them remains open. The way forward is not a return to the pre-pandemic "normal" nor the uncritical acceptance of superficial digitalization. The way forward is the deliberate construction of an intelligent hybrid assessment ecosystem, where technology serves more authentic, formative, equitable, and competency-centered assessment for the 21st century. This is the urgent mandate for higher education institutions that aspire to be relevant and resilient in the digital age. The reinvention of assessment is, in essence, the reinvention of the pedagogical heart of the university.

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