

Beyond moral panic: the algorithmic self at the intersection of UDL, instructional automation, and agency in the post-digital era

Antoni Balestra ¹

¹ Link Campus University; a.balestra@unilink.it

Abstract: This article reframes educational technology in the post-digital era as a regime of decision-making rather than a set of tools. In a condition of infrastructural saturation, datafication and assessment platforms reshape the rules of recognition, producing an “algorithmic self” whose trajectories become legible or opaque according to what counts as evidence. Against the polarisation between techno-solutionism and moral panic, inclusion is treated as a procedural requirement rather than a rhetorical claim. Universal Design for Learning (UDL) is presented as both a pedagogical response and a governance framework for instructional automation, because it makes explicit, *ex ante*, the links between objectives, criteria, and commensurable forms of evidence, and it renders decisions transparent and contestable. Two design lenses, affordances and cognitive load, are used to show how digital environments can reduce or amplify cognitive barriers, and how standardised traces can generate epistemic injustice by devaluing legitimate forms of expression. A three-mode taxonomy of automation—assistive, augmentative, and delegative—is then outlined, with UDL operating respectively as enabler, coherence constraint, and veto criterion, thereby protecting agency and the curriculum from metric-driven “shadow curricula”. The analysis is finally connected to the European regulatory context (GDPR, Accessibility Act, AI Act), where transparency, human oversight, explainability, and contestability increasingly function as institutional obligations. Implications are discussed for assessment literacy and for governing automation by design.

Keywords: post-digital education; Universal Design for Learning; instructional automation; epistemic justice; agency.



Copyright: © 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The term post-digital does not denote a chronological “after”, but rather a condition of saturation in which the digital is no longer an event or an add-on, but an environment and an infrastructure (platforms, registers, tracking systems). In this scenario, schools do not simply “adopt” technologies; they incorporate socio-technical devices that reorganise time, forms of assessment, criteria of recognition, and practices of accountability. The resulting change affects not only the means, but the rules of the game. Within this space, the “algorithmic self” takes shape and consolidates, as an educational subjectivity co-produced by metrics, traces, and evaluative routines which, by selecting what counts as evidence, can render some trajectories legible and others opaque, with the risk of turning learning into a profile and competence into an index (Williamson, 2017; Williamson et al., 2020).

Public debate nevertheless tends to polarise between techno-solutionism and moral panic. The former attributes to technical novelty the capacity to solve structural problems, while the latter treats technology as a generalised threat to the quality of schooling. Although these positions diverge in their value judgements, they converge on one point: they shift attention away from pedagogical mediation and design responsibility (objectives, criteria, assessments, conditions of access) towards tools as such, losing sight of the fact that relevant innovation is often innovation in the rules of recognition (Selwyn, 2016). Datafication and assessment devices render some trajectories legible (those that leave traces compatible with indicators) and others opaque (non-standard strategies, slow learning, oral or situated contributions, competences that are not easily quantifiable). The real change is not a new platform, but what is recognised as valid learning, through which forms of evidence, according to which criteria, and for whom.

This article proposes a possible third way, taking Universal Design for Learning (UDL) as a pedagogical response and, at the same time, as a governance framework for instructional automation (what to automate, according to which criteria, and with which safeguards). Since automation operates precisely on criteria and evidence, UDL provides an *ex ante* design grammar that makes public the link between objectives, criteria, and equivalent forms of evidence or pathways, thereby turning inclusion into a verifiable property of the curriculum (CAST, 2018; Meyer et al., 2014). From this follows the thesis that guides our argument. In the post-digital era, inclusion coincides with the institutional capacity to make decisions transparent and contestable, including automated decisions, in terms of the criteria applied, the data used, and the possibility of review (European Union, 2016, 2024; Article 29 Data Protection Working Party, 2018), while preserving the commensurability of constructs (the same competence, different yet comparable evidence) and agency (room for choice and control).

2. Inclusion as Procedure

If, in the post-digital condition, decisions are steered by data and metrics, then inclusion cannot remain at the level of rhetoric; it must be translated into public procedures that specify criteria and evidence.

Inclusive rhetoric becomes problematic when it replaces design with declaration. Not because values are irrelevant, but because, without a procedural architecture—objectives, criteria, evidence, and responsibility—values do not translate into verifiable obligations. Inclusion, when treated with rigour, functions as an operational principle. It orients anticipatory design, defines intentional mediations, establishes public criteria, and makes traceable the processes that produce outcomes, so that choices can be inspected, debated, and, where necessary, corrected (Balestra, 2025). When explicit objectives and criteria are missing, inclusion can coexist with selective practices. Schools proclaim equity while rewarding those who can decipher implicit codes, and assessment ends up relying on tacit conventions and undeclared routines (Bourdieu & Passeron, 1970/1972; Canevaro, 2007; Ianes & Demo, 2022). Put differently, stating an intention to include everyone expresses a value, noble yet abstract; stipulating that every pupil has equivalent ways of accessing content (e.g., audio, video, structured text) establishes a verifiable obligation. If such modalities are absent, the declared value does not disappear, but the operational condition that makes it enforceable does.

Two recurring risks clarify what is politically at stake. The issue is political because it distributes recognition and opportunity, deciding who is read as competent, through which forms of evidence, and under what conditions. The first risk is the merit narrative as mere selection. “Quality” is conflated with the capacity to navigate undeclared routines, with the result that judgement tends to reflect cultural capital more than achieved learning (Bourdieu, 1986/2015; Bourdieu & Passeron, 1970/1972). The second risk is inclusion-washing, namely declarations of principle that are not followed by public criteria, verifiable mediations, and responsibility for conditions. This occurs, for example, when a school self-describes as “inclusive” in its School Development Plan (PTOF) without making explicit the assessment criteria, the conditions of access to tasks, and the minimum set of expected tools and supports, thereby reducing inclusion to a good intention that is, in practice, devoid of binding constraints.

The safeguards are not rhetorical but procedural. They require explicit objectives and criteria from the outset, feedback that supports improvement, moderation of judgements among teachers, and documentation of instructional choices and expected evidence, in order to make expectations explicit, reduce arbitrariness, and render decisions revisable (Castoldi, 2011; Castoldi, 2016; Wiliam, 2011).

Within this frame, merit comes to mean demonstrable progress against shared standards, and inclusion becomes a controllable practice. Yet such controllability is not automatic. It depends on how criteria, evidence, and responsibilities are enacted, and it can degenerate into surrogates that preserve form without substance. The drifts that follow share a common feature. They decouple inclusion from design, replacing mediation with substitutes (compliance, presence, label).

A particularly insidious drift is bureaucratisation. Forms and grids, useful as supports, sometimes replace co-design, and professional dialogue is displaced by compliance; accountability is reduced to checking documents, while the didactic analysis of tasks is weakened, with the effect of documenting a great deal without learning from instructional work (Canevaro, 2007; Canevaro & Ianes, 2023). The response is not to reduce documentation, but to restore its epistemic status, providing protected time for collegial reading of tasks and data, for task analysis, and for strong alignment between stated objectives, activities, and expected evidence, so that documentation supports didactic decisions rather than merely justifying them *ex post*.

Another drift, which may be described as tokenism, consists in confusing physical presence with inclusion, while pupils’ voices and their capacity to influence the work remain marginal. Subtle exclusions proliferate within apparently neutral routines, because what is left implicit (expectations, time, tools) tends to reward familiarity and conformity. From a justice perspective, what matters are clear rules, shared criteria, and effective opportunities for participation. Participation is not simply “being there”, but contributing competently to the construction of meaning within frames that make expectations, time, tools, and modes of assessment transparent (Slee, 2011).

Finally, medicalisation rigidifies pathways when labels—although necessary for rights—become curricular destinies, and schools abdicate when they relinquish the mediation that translates objectives into accessible tasks, confusing protection with an implicit lowering of expectations. The capabilities perspective redirects attention towards substantive freedoms and valuable functionings, requiring accessible language, adequate time, and tools and practices that open up authentic choices without

lowering cognitive ambition (Sen, 1999; Nussbaum, 2012). In continuity with the Italian tradition of special education, the essential inclusive device is not individual accommodation, but the curriculum as an “open work”, designed a priori to accommodate variability (Cottini et al., 2019). This is precisely where UDL should be understood, as a procedural architecture that replaces slogans with design by design, making explicit the link between objectives, criteria, and evidence and, therefore, making inclusion verifiable.

3. Design and Epistemic Justice

In the post-digital condition, the issue is not abstract but design-related. Digital–didactic design can reduce, or amplify, cognitive barriers. To get to the heart of the matter, we draw on two complementary lenses: affordances and cognitive load.

Affordances are not “functions” in the abstract, but action possibilities made likely by an environment in relation to purposes, constraints, and rules of use, that is, possibilities for action made salient and practicable through design, including as “perceived affordances”. A system may invite iterative revision and peer feedback, or instead push towards one-off submissions and self-centred performances; it may make criteria and the traceability of quality explicit, or leave everything implicit. In this sense, affordances should be read as a politics of the possible, because what is immediate, and what is cumbersome, helps to define which practices become normal (Gibson, 1977, 1979; Norman, 2013). From a UDL perspective, the question becomes which routes of representation and of action/expression are made practicable, and whether they are genuinely equivalent with respect to the same intended outcome (CAST, 2018).

The second axis is cognitive load. Poor design is not merely “inconvenient”; it consumes attentional resources on elements extraneous to the task and, in doing so, produces inequality of access to meaning. Long, unsegmented materials that lack signalling, contain seductive details, and rely on uncontrolled redundancy increase extraneous load; segmentation, coherence, signalling, and modality management reduce noise and free resources for germane load, thereby supporting deeper understanding (Harp & Mayer, 1998; Mayer, 2021; Sweller et al., 2011). The point is decisive, because educational accessibility does not coincide with the mere availability of content, but with its intelligibility and cognitive navigability.

Typical examples show how design becomes a barrier. A PDF scanned as an image, lacking logical structure, does not merely hinder technical access; it forces a decoding effort that shifts energy from comprehension to interface management. Similarly, a video without subtitles, overly long and unsegmented, with abundant peripheral information, increases extraneous load and penalises the construction of conceptual schemas (Mayer, 2021; Sweller et al., 2011). In UDL terms, the correction is not to “simplify the objectives”, but to reduce non-pertinent cognitive friction, so as to preserve shared ambition while offering multiple and commensurable routes of access and of demonstration (CAST, 2018).

At this point, epistemic justice becomes salient. When platforms and datafied routines standardise what counts as evidence, some forms of expression risk being downgraded as noise. The risk of the algorithmic self lies in what Fricker calls testimonial injustice, namely a credibility deficit that affects pupils when their forms of expression—although pertinent to the construct—do not fit standard tracking parameters and are discounted as irrelevant. Here “prejudice” operates as an embedded

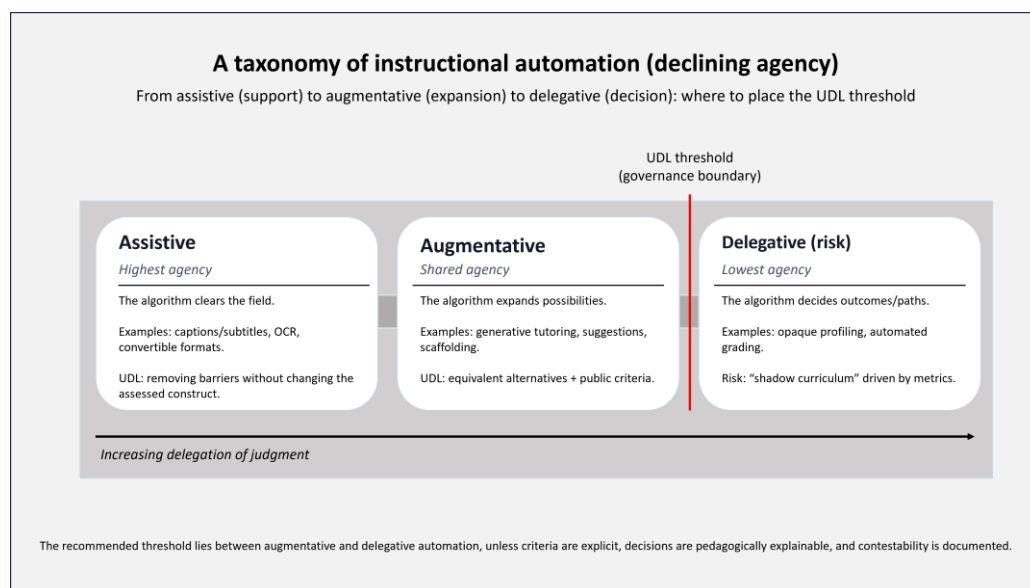
criterion of legibility, granting greater reliability to what is more easily traceable (Fricker, 2007; Williamson, 2017). The problem, then, is not the pupil's "ability", but the credibility economy produced by design, which determines which forms of evidence become legible, which are rendered invisible, and thus which forms of learning become recognisable.

4. Automation and Agency

If, in the post-digital condition, automation is available, the question is not only whether to use it, but above all where to place the threshold beyond which automation may erode agency and narrow the curriculum. From this perspective, UDL does not function as a "list of strategies", but as a stopping criterion, because it can indicate when automation remains consistent with variability, the commensurability of constructs, and the contestability of decisions.

In light of the argument developed so far, we propose a functional taxonomy of instructional automation articulated in three modes. Figure 1 summarises the gradient of delegation of judgement and the UDL threshold between augmentative and delegative automation.

Figure 1. Taxonomy of instructional automation and the UDL threshold.



Assistive automation. In this first mode, automation reduces friction and removes barriers without intervening in judgement. Captions/subtitles, transcripts, and navigation tools are examples in which the algorithm "clears the field", making competent action more likely. In this mode, automation functions as a transparent lens: it does not intervene in judgement or alter the assessed construct, but facilitates access for all learners. This is the zone in which automation is fully compatible with UDL, because it supports accessibility by design and reduces extraneous load while keeping the assessed construct intact.

Augmentative automation. In this mode, automation functions like scaffolding. It expands possibilities and increases learners' "degrees of freedom" by offering examples, alternative routes, and support for revision. This is a useful but unstable zone, because expansion does not automatically amount to equity. The pedagogical condition here is stringent, because the institution must ensure that different forms of expression are assessed against the same construct, avoiding a situation in which facilitation of form becomes a surrogate for substance. In this scenario, UDL operates as a coherence constraint. The scaffolding should support the learner's autonomy without substituting for their cognitive effort. Multiplying routes does not mean multiplying criteria; it means maintaining stable cognitive ambition.

Delegative automation. In this third mode, automation transfers portions of judgement to systems that classify, recommend, or decide on pathways and assessment. It may be described as the highest-risk zone, where the erosion of agency can occur through absorption. In this mode, teachers and learners tend to realign themselves to metrics in order to avoid conflict with the system, and learning is reorganised around computable signals. Here automation ceases to be a tool and becomes a substitute for human judgement, often operating as a "black box" that may be opaque, particularly in the absence of robust institutional safeguards. In this mode, UDL becomes a veto criterion. Delegation is incompatible with inclusion when it obscures criteria, renders outcomes non-contestable, or shifts evaluative weight towards what the system "sees" best.

UDL can serve as a prudential tool for delimiting the perimeter of automation, preventing it from crossing into the delegative threshold, except where particularly robust institutional safeguards are in place. The threshold is crossed when the objective–evidence–criterion link is no longer explicable in pedagogical terms, when the plurality of evidence is reduced to a standard set, and when the cost of contestation, in terms of time, expertise, and access to data, becomes too high for the learner. Agency, in this perspective, is not a psychological disposition, but an institutional property of a system of rules that makes deliberate action possible and recognised.

5. Regulation and Governance

The threshold between automation and agency is not only a pedagogical question, but also a question of governance. Within the European framework, what UDL prescribes as good design is increasingly translated into institutional obligations, making transparency, oversight, explainability, and contestability requirements of accountability and compliance.

The AI Act introduces a regime of obligations for AI systems when they fall within those classified as high-risk, particularly in contexts that affect educational opportunities and rights, and it requires risk management, transparency, traceability, and human oversight (European Union, 2024). For schools, the implication is substantial, because the adoption of systems that influence assessment, guidance, or access to services cannot be treated as a merely technical choice. It becomes necessary to be able to reconstruct how the system presents data and recommendations, which operational criteria it applies, and which margins for human intervention are effectively guaranteed.

Here inclusion-washing changes status. It is no longer only a gap between discourse and practice but may become a potential compliance breach. If an institution declares inclusion or personalisation while adopting opaque systems that are

non-contestable or lack effective oversight, it exposes its governance to regulatory fragility, because the legal framework demands traceability and human control. These are conditions that UDL translates pedagogically into public objectives and criteria, equivalent alternatives, and channels for review (Balestra, 2025).

The GDPR regulates data governance by requiring lawfulness, specified purposes, minimisation, and transparency, and by placing limits on decisions based solely on automated processing when they affect individuals' rights (European Union, 2016). In schools, this means that it is not enough to "collect data" or adopt analytics. Purposes must be stated, informational excess reduced, logics of use made comprehensible, and evaluative heteronomies prevented. In this sense, UDL functions as an alignment framework. If objectives, criteria, and assessments are designed *ex ante* and made public, data can be governed in a proportionate and formative way, avoiding a situation in which measurement becomes surveillance or masked selection (CAST, 2018; European Union, 2016).

Directive (EU) 2019/882, known as the European Accessibility Act, together with associated technical standards, shifts accessibility from a "good intention" to a design and procurement requirement, within the scope of covered products and services and the relevant procedures. In this framework, products and services must be accessible *ex ante* (Directive (EU) 2019/882, 2019; ETSI, 2021; W3C, 2018). Here too, inclusive language without observable requirements is unsustainable, because if environments, content, and platforms do not meet accessibility criteria, the school is not only failing an educational aim but may be crossing a compliance threshold.

Contestability is the element that connects law, design, and agency. If a learner can contest a datum, or an outcome produced by, or influenced by, an AI system, they are not "asking for a better mark"; they are exercising reflective agency and learning to read the grammar of algorithmic power, along with the mechanisms through which the system assigns credibility to evidence. In this sense, contestability becomes a form of data literacy, because it enables questions about which data count, which criteria are applied, and which equivalent alternatives are admissible for demonstrating the same outcome (Williamson, 2017; Williamson et al., 2020).

Within this frame, the threshold between augmentative and delegative automation is not merely a pedagogical criterion, but a line of governance, because it demarcates when innovation remains a support for learning and when it becomes an opaque delegation of judgement.

6. Conclusions

Moving beyond moral panic does not mean accepting automation uncritically. It means shifting our gaze from technology as an object to technology as a regime of decision-making, avoiding the simplifications typical of moral panic and the construction of "folk devils" (Cohen, 1972/2019).

In the post-digital condition, inclusion cannot be a downstream remedy but must be designed by design. In this sense, UDL is not a repertoire of strategies, but a design grammar that makes explicit the rules of recognition, establishes public criteria, and constrains the equivalence of evidence, thereby turning inclusion into a verifiable practice (CAST, 2018; Meyer et al., 2014; Balestra, 2025).

The proposed taxonomy enables UDL to be read as a tool for the governance of automation. Governing does not mean deciding "how much" technology to use but placing a threshold that protects agency and the curriculum. In assistive automation,

UDL enables, because it removes barriers without intervening in judgement; in augmentative automation, it constrains, because it permits scaffolding on the condition that the construct and criteria remain stable; in delegative automation, it introduces a veto, because delegating portions of judgement risks reducing the plurality of evidence to what is most easily traceable. This is where a credibility injustice may arise, when a learner's performance is replaced by an algorithmic projection of their profile and some forms of expression, although pertinent to the construct, are discounted as noise (Fricker, 2007; Williamson, 2017; Williamson et al., 2020).

This framework is reinforced by the European regulatory context, which turns into accountability and compliance requirements the conditions that UDL frames as design quality, from transparency to human oversight, from explainability to contestability, alongside obligations relating to data governance and ex ante accessibility (European Union, 2016; Directive (EU) 2019/882, 2019; European Union, 2024). In such a scenario, inclusion-washing is no longer merely pedagogical inconsistency, but a governance fragility.

There remains, however, a non-negotiable professional condition: assessment literacy. Without the capacity to define constructs, build public rubrics, ensure equivalence across modes of expression, and sustain cycles of feedback and review, schools can neither govern inclusion nor automation and end up being subjected to them as rhetoric or as metric (Castoldi, 2011; Castoldi, 2016; Wiliam, 2011).

From this perspective follow three questions for future work. Who designs the school "algorithmic self", and with which interests? Which forms of evidence are missing, and what are we ceasing to see because it is not traceable? How can we educate algorithmically literate teachers who are able to govern the ethical and evaluative premises of automation rather than being governed by the algorithm? The challenge, ultimately, is not to manage a machine, but to preserve the space of pedagogical judgement as a human and institutional act, transparent and contestable.

References

- Article 29 Data Protection Working Party. (2018). Guidelines on automated individual decision-making and profiling for the purposes of Regulation 2016/679 (WP251rev.01). European Commission.
<https://ec.europa.eu/newsroom/article29/redirection/item/612053>
- Balestra, A. (2025). *Universal Design for Learning, tecnologie educative e inclusione: Le sfide dell'educazione post-digitale*, Franco Angeli.
- Bourdieu, P. (2015). *Le forme del capitale* (B. Grüning, Trans.; M. Santoro, Ed.; M. Santoro, Int.). Armando. (Original work published 1986).
- Bourdieu, P., & Passeron, J.-C. (1972). *La riproduzione: Elementi per una teoria del sistema d'insegnamento* (G. Maghini, Trans.). Guaraldi. (Original work published 1970).
- Canevaro, A. (2007). *L'integrazione scolastica degli alunni con disabilità. Trent'anni di inclusione nella scuola italiana*. Erickson.

- Canevaro, A., & Ianes, D. (2023). *Un'altra didattica è possibile: Esempi e pratiche di ordinaria didattica inclusiva*. Edizioni Centro Studi Erickson.
- CAST. (2018). *Universal Design for Learning guidelines version 2.2*.
- Castoldi, M. (2011). *Progettare per competenze: Percorsi e strumenti*. Carocci.
- Castoldi, M. (2016). *Valutare e certificare le competenze*. Carocci.
- Cohen, S. (2019). *Demoni popolari e panico morale: Media, devianza e sottoculture giovanili*. Mimesis. (Original work published 1972)
- Cottini, L., et al. (2019). *Universal design for learning. Verso il curriculum per l'inclusione*. Giunti Edu.
- European Telecommunications Standards Institute. (2021). EN 301 549 V3.2.1: Accessibility requirements for ICT products and services.
- European Union. (2016). Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).
<https://eur-lex.europa.eu/eli/reg/2016/679/oj/eng>
- European Union. (2019). Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services.
<https://eur-lex.europa.eu/eli/dir/2019/882/oj/eng>
- European Union. (2024). Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending certain Union legislative acts (Artificial Intelligence Act). <https://eur-lex.europa.eu/eli/reg/2024/1689/oj/eng>
- Fricker, M. (2007). *Epistemic injustice: Power and the ethics of knowing*. Oxford University Press.
- Gibson, J. J. (1977). The theory of affordances. In R. E. Shaw & J. Bransford (Eds.), *Perceiving, acting, and knowing: Toward an ecological psychology* (pp. 67–82). Lawrence Erlbaum.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.
- Harp, S. F., & Mayer, R. E. (1998). How seductive details do their damage: A theory of cognitive interest in science learning. *Journal of Educational Psychology*, 90(3), 414–422.
- Ianes, D., & Demo, H. (2022). *Specialità e normalità*. Erickson.
- Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press.
- Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. CAST Professional Publishing.
- Norman, D. (2013). *The design of everyday things* (Rev. and expanded ed.). Basic Books.

- Nussbaum, M. C. (2012). *Creare capacità: Liberarsi dalla dittatura del PIL*. Il Mulino.
- Selwyn, N. (2016). *Is technology good for education?* John Wiley & Sons.
- Sen, A. (1999). *Development as freedom*. Alfred A. Knopf.
- Slee, R. (2011). *The irregular school: Exclusion, schooling and inclusive education*. Routledge.
- Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory*. Springer.
- World Wide Web Consortium. (2018). *Web Content Accessibility Guidelines (WCAG) 2.1*.
<https://www.w3.org/TR/WCAG21/>
- Wiliam, D. (2011). *Embedded formative assessment*. Solution Tree Press.
- Williamson, B. (2017). *Big data in education: The digital future of learning, policy and practice*. Sage.
- Williamson, B., Bayne, S., & Shay, S. (2020). The datafication of teaching in higher education: Critical issues and perspectives. *Teaching in Higher Education*, 25(4), 351–365.