2022

# Value-Informed Innovation: Integrating Value-Sensitive Design and Evidence-Informed Practice in Education

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# VALUE-INFORMED INNOVATION: INTEGRATING VALUE-SENSITIVE DESIGN AND EVIDENCE-INFORMED PRACTICE IN EDUCATION

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**Abstract** Digital innovation in education – as in any other sector – is not only about developing and implementing novel ideas, but also about having these ideas effectively used as well as widely accepted and adopted, so that many students can benefit from innovations improving education. Effectiveness, transferability and scalability cannot be added afterwards; it must be integrated from the start in the design, development and implementation processes, as is proposed in the movement towards evidence-informed practice (EIP). The impact an educational innovation has on the values of various stakeholders is often overlooked. Value Sensitive Design (VSD) is an approach to integrate values in technological design. In this paper we discuss how EIP and VSD may be combined into an integrated approach to digital innovation in education, which we call *value-informed innovation*. This approach not only considers educational effectiveness, but also incorporates the innovation's impact on human values, its scalability and transferability to other contexts. We illustrate the integrated approach with an example case of an educational innovation involving digital peer feedback.

**Keywords:** digital innovation in education, value-sensitive design, evidence-informed practice.

University of Maribor Press

DOI https://doi.org/10.18690/um.fov.4.2022.16
ISBN 978-961-286-616-7

## 1 Introduction

Digital innovation in education – as in any other sector – is not only about developing and implementing novel ideas, but also about having these ideas effectively used as well as widely accepted and adopted so that many students can benefit from innovations improving education. However, especially in pressing circumstances such as a lockdown, there is a considerable risk of introducing ad hoc innovations that do not deliver the expected effect or, even if they do, are not scalable or transferable to other contexts.

Effectiveness, transferability and scalability cannot be added after an innovation has been designed, developed or implemented in educational practice. Instead, it must be integrated in the design, development and implementation processes and from the start be an integral part of innovation development. Evidence-informed practice (EIP) has the potential to facilitate this integration. EIP aims to achieve greater effectiveness as well as scalability and transferability of educational innovations by making use of three types of evidence when generating educational innovations: 1) evidence from scientific research, 2) evidence from practical expertise and experience, and 3) evidence from local (system) data (Brown & Malin, 2022). Engagement of others during the design process is also promoted by Froyd et al. (2017), who argue that a *propagation* approach, encompassing the early engagement of stakeholders and potential future adopters, has more chance of successfully transferring effective educational innovations to other contexts than a dissemination approach.

A very relevant, but often overlooked, aspect in the adoption of educational innovations is the impact an innovation has on the personal values of the various stakeholders. Values in educational innovation have received increasing attention in society with the emergence of various examples of unrest generated by digital innovations. An example is the ongoing discussion about the use of online proctoring software (Appelman et al., 2021; Ebbinghaus & Bös, 2020; Harwell, 2020; Scienceguide, 2022; Singer & Krolik, 2021). The importance of values is subscribed by Cukurova et al. (2019) who propose to include the perspectives and values of users as a fourth type of evidence in educational innovation. However, in what way the value perspective can be incorporated in EIP is not explicitly discussed by Cukurova et al. (2019), and this is lacking from other EIP literature as well.

Value Sensitive Design (VSD) is an approach to integrate values in technological design. VSD originates from the fields of information systems design and human-computer interaction (Friedman et al., 2006). It is characterized by engaging both direct and indirect stakeholders in assessing the impact a new design may have on their values, such as autonomy, trust, responsibility, safety or wellbeing, and what design choices will generate the most positive impact. Applying VSD to the topic of online proctoring software, for instance, generated 21 additional implementation criteria to the criteria that were derived from a functional investigation including test runs with the software (van Steenbergen & van der Spoel, 2021).

In this paper we discuss how EIP and VSD may be combined into a integrated approach to digital educational innovations, which we call *value-informed innovation*, that not only considers educational effectiveness, but also takes into account the innovation's impact on human values, its scalability and its transferability to other contexts.

In the next section we discuss the theoretical background of VSD and EIP separately. In Section 3 we combine the two by incorporating values in EIP, using the ADDIE model to structure activities taken from VSD. We illustrate the integrated approach in Section 4 with the example of an educational innovation involving peer feedback and conclude with discussion and conclusions in Section 5.

## 2 Theoretical Framework

### 2.1 Value Sensitive Design

Value Sensitive Design (VSD) is "*a theoretically grounded approach to technology design that takes human values into account in a principled and comprehensive way throughout the design process*" (Friedman et al., 2006, p. 349). Human value is defined in VSD as "*what is important for people in their lives, with a focus on ethics and morality*" (Friedman & Hendry, 2019, p. 4). VSD goes beyond instrumental aspects such as functionality, reliability and ease of use, integrating potential impact on moral values of individuals, groups and societies in the design process. VSD distinguishes four types of stakeholders whose values must be taken into account: the sponsor of the new design, the project team doing the design, the envisioned users of the design, called direct stakeholders,

and persons or groups that may be affected by the design though they do not use it themselves, called indirect stakeholders. Especially identifying potential impact on the values of indirect stakeholders requires careful and creative thinking. It requires going beyond the intended use of the design and consider what might happen when use of a design continues far into the future (time perspective) or is spread to other, possibly unintended, contexts (pervasiveness perspective).

The values of all stakeholders, as well as possible tensions between those values, are examined iteratively in what VSD calls a conceptual, empirical and technical investigation. At a conceptual level, the relevant stakeholders and values are identified and defined based on existing literature and knowledge. At an empirical level, the perception of these values by the different types of stakeholders is studied by means of methods such as interviews, focus groups or experiments, leading to the elaboration of the values into norms. At a technical level, values and norms are translated into technical design. VSD has been applied to a variety of technological designs, such as wind parks (Oosterlaken, 2015), browsers (Friedman et al., 2002), educational apps (van der Stappen & van Steenbergen, 2020) and social robots (Smakman et al., 2021).

## 2.2 Evidence-Informed Practice in Education

Inspired by a trend in the health and social work professions, the attention for using evidence to inform educational practice has attracted increasing attention in the last decade or so (Nelson & Campbell, 2017; Nevo & Slonim-Nevo, 2011). Moving away from a (deterministic) step-wise approach usually denoted by evidence-*based* practice, the term evidence-informed practice (EIP) has become common in the field to describe the utilization of knowledge (evidence) by educational professionals to improve their practice (Brown & Malin, 2022; Nevo & Slonim-Nevo, 2011).

According to Brown and Malin (2022, p. 2), EIP can be described as *'fostering situations in which teaching practice is deliberately informed by knowledge such as: (1) formal research; (2) evidence produced by practitioners' inquiries; and/or (3) evidence derived from school- or system-level data (e.g., student assessment data)'*. Another definition of EIP is posed by Nelson and Campbell (2017, p. 129)*: 'EIP must be seen as the integration of professional judgement, system-level data, classroom data and research evidence.'* In both definitions, the

same three types of evidence – on which we elaborate in the next section – are mentioned that should be incorporated in the improvement of teaching practice.

Educational professionals may have different goals to work in an evidence-informed way. On the most basic level, using evidence to inform the process of implementing an educational innovation will increase the chance of being successful because the decisions made will be sound and grounded in knowledge. If in addition a validated process model such as the ADDIE approach (Branch, 2009) is used, the probability of making the right decisions in the right order will increase further. On a higher level of ambition, working in an evidence-informed way will help to extend the knowledge base by allowing for and facilitation of the vertical spread of the innovation (scaling up) and/or horizontal spread of the innovation (transfer to different contexts).

## 2.3 Types of Evidence in EIP

As mentioned above, according to Brown and Malin (2022), three types of evidence should be utilized by educational professionals: 1) formal research, or scientific evidence, 2) practical expertise, or practice-based evidence, and 3) (school) system data, or local evidence.

### Scientific evidence

Scientific evidence relates to knowledge about 'what works and why' based on theories developed through formal research. Brown et al. (2017) describe research-informed teaching practice (RITP) as teaching practice being informed by practitioner expertise as well as external., peer-reviewed research published by academic researchers. Examples are (systematic) literature reviews, empirical (lab) studies, qualitative studies and meta / effect studies. Scientific evidence is sourced from theory and literature.

### Practice-based evidence

Practice-based evidence has been developed through practice-based research, describes 'what works where and for whom' and indicates success factors for implementation and contextual barriers and facilitators. Ideally , this type of evidence is transferable and generic in order to be informative in a different context, and for the outcomes to be scaled up to support a broader field of application (Andriessen, 2016). Examples are co-design-based studies, (didactical) usability studies, prototyping, and good or best practice descriptions (Prinsen & van der Stappen, 2021). Practice-based evidence is sourced from implementation contexts other than the one in which the innovation is developed.

### Local evidence

Local evidence is knowledge obtained by systematically analysing multiple existing data sources within the school to describe 'what happens in our school'. These data sources can be both quantitative and qualitative, e.g., student characteristics, achievement data, classroom observations and system log files of learning management systems (LMSs) (Brown et al., 2017). Applying this evidence to innovate educational practice as well as to evaluate such innovations is called data-based decision making (Schildkamp & Kuiper, 2010). Local evidence is sourced from the specific implementation context in which the innovation is developed.

## 2.4 Propagation of Educational Innovations

EIP is the combined usage of local, practice-based and scientific evidence (Brown et al., 2017; Nelson & Campbell, 2017; Nevo & Slonim-Nevo, 2011). This combination of perspectives can be considered as 'triangulation of evidence' to improve practice and has the potential to contribute to the propagation of innovations. We consider the propagation of innovations as the stimulation and facilitation of both vertical spread (*scalability*) and horizontal spread (*transferability*) of improvements to teaching and learning (Brown & Malin, 2022).

Froyd et al. (2017) argue that a propagation paradigm towards educational innovation is paramount to eventually achieve system-wide adoption of an innovation. This propagation paradigm has an equal emphasis on both fit and

efficacy of the educational innovation being developed. Early stakeholder engagement including stakeholders from a diverse set of contexts is central to the approach, as is learning how the innovation should be implemented best through engaging with potential users and adopters.

To fit an innovation effectively to the implementation context – and to ultimately reach adoption of the innovation – it is crucial that the innovation in question does not harm the values of direct and indirect stakeholders related to that context. If negative consequences of the innovation have impact on (intended) users and adopters, the remedy might be worse than the ailment. Indeed, Davies (1999, p. 115) already stated more than 30 years ago that consideration of values is paramount: *»Evidence is also required about ethical issues of educational [or care] practice, such as whether or not it is right or warrantable to undertake a particular educational activity [or health care intervention].»*

Since then, many perspectives and approaches towards the utilization of evidence in professional practice have been proposed, but ethical issues have largely been underexposed. Recently, Cukurova et al. (2019) emphasized the use of four sources of information, in which the first three types of evidence are the ones mentioned above, whereas the fourth type of evidence is »*the perspectives and values of those people who are directly or indirectly affected*« (Cukurova et al., 2019, p. 5). What is currently missing however, are insights into how to incorporate values of direct and indirect stakeholders into the implementation of educational innovations.

### 2.5 Relation to other approaches combining research and practice

Several approaches exist that also combine research and practice and share similar underlying principles with EIP, such as Design Science Research (Hevner et al., 2004), Action Research (Babüroglu & Ravn, 1992; Baskerville & Wood-Harper, 1998) and Action Design Research (Sein et al., 2011). However, these research approaches all combine rigor and relevance towards the goal of theory advancement by e.g., incorporating practice and real-world usage into the research process. EIP, and our proposed approach, have the aim of incorporating existing knowledge into the work process of (educational) professionals, but not the goal of generating new knowledge.

## 3 Incorporating Values in Evidence-Informed Practice

A widely adopted systematic approach to instructional design and educational innovation is ADDIE (Branch, 2009), which comprises five phases from where the acronym originates: Analyze, Design, Develop, Implement and Evaluate. In all phases of this methodic approach, we can utilize the different types of evidence as described in Section 2.3. In Figure 1, we illustrate how we can incoporate practice-based evidence sourced from other implementation contexts (left), local evidence sourced from the specific implementation context in which we are running through the five ADDIE phases (center), and scientific evidence sourced from theory and literature (right).

Since the ADDIE approach was introduced, more agile and iterative approaches have been adopted in many professional domains concerned with design – starting from software engineering – as well as in education. It is possible to incorporate such short-cycled iterations within the ADDIE approach, as is depicted by the smaller cycle positioned behind the three phases Design, Develop and Implement. The process starts with Analyze, subsequently running through Design, Develop and Implement in several iteration cycles, and rounding off with Evaluate. Partial, focused evaluations will be conducted within each of these iterations to guide the planning of the next iteration. In the final Evaluation phase, the innovation process is evaluated in an integral manner.

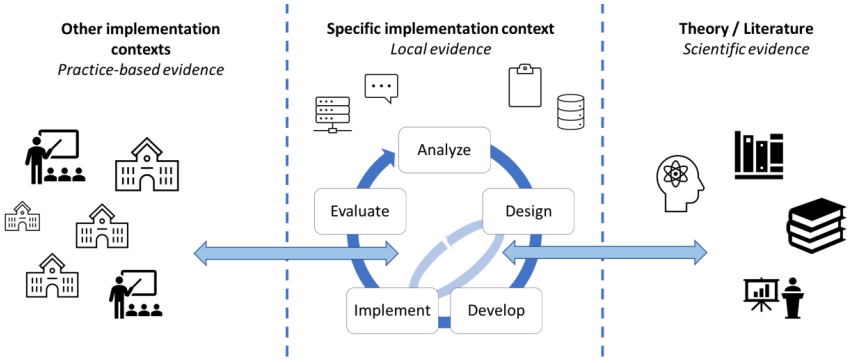


**Figure 1: Utilizing different types of evidence in EIP within the ADDIE approach**

VSD adds the perspective of moral impact to the aims of effectiveness, transferability and scalability. As VSD is strongly based on stakeholder engagement, it also aligns well with the propagation paradigm as proposed by Froyd et al. (2017). It enriches conversations with practitioners by introducing the topic of personal values and widens the scope of conversational partners by explicitly including persons or groups that do not directly engage with the educational innovation but are nevertheless impacted by it (e.g., housemates of students when using online proctoring software). In Figure 2, we illustrate which VSD-activities can be undertaken to elicit *value-based evidence* from all three sources of evidence: other implementation contexts, the specific implementation context in question, as well as from literature.

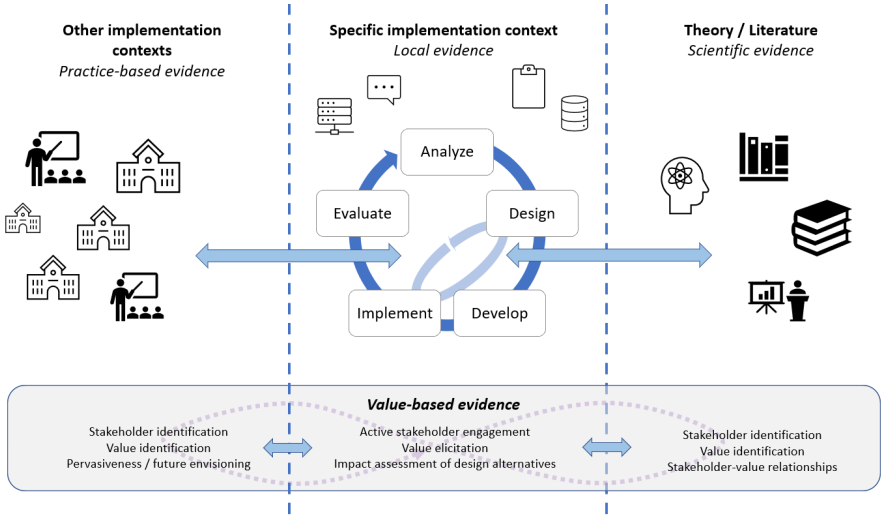


**Figure 2: Combining VSD with EIP**

VSD adds another focus of investigation: human values. What values to take into account in what manner, is based on academic literature (conceptual investigation), as well as practice-based knowledge (conceptual and empirical investigation) and local data (technical investigation). Typical VSD activities that are added are stakeholder indentification, value identification, pervasiveness/future envisioning, active stakeholder engagement, value elicitation and impact assessment of design alternatives. How these activities may take shape in the ADDIE phases is illustrated in the next section.

## 4 Worked Example of the Integrated Approach

To illustrate how the integration of VSD in EIP might work, we walk through an hypothetical example process of introducing digitally supported peer feedback. This example case is one where for a specific course, a team of educators consider the introduction of peer feedback. The reasons for considering peer feedback are that the teachers are experiencing a high workload, many students are failing the course and students have consistently been asking for more and more timely feedback on their work. The hope is that allowing students to provide feedback on each other's work digitally will have a positive impact on all of these issues simultaneously.

**Table 1: Examples of the utilization of various types of evidence in the process of implementing an educational innovation**

| | Local evidence | Practice-based evidence | Scientific evidence | Value-based evidence |
|---|---|---|---|---|
| **Analyze** | Check assumptions:<br>- assess teacher workload in objective quantities related to teacher activities<br>- describe quantity and timing of received feedback<br>- analyse students' performance and engagement during the course | Inquire about good – and bad – practices of the application of peer feedback and the observed results<br><br>Request expert feedback on the problem analysis | Check literature for evidence on peer feedback, e.g.<br>- To what extent does it lower teacher workload?<br>- What does it require from students to be deployed successfully? | Check literature for identification of stakeholders and values in relation to peer review<br><br>Identify potential value tensions in using peer feedback<br><br>Apply time and pervasiveness perspectives to the envisioned peer feedback |
| **Design** | Compare alternative existing configurations / administrations from the peer feedback system | Brainstorm with colleagues and experts on redesign of course with peer feedback integrated within local constraints | - State intended goals of the innovation based on scientific insights on the added value and effectiveness of peer feedback<br>- Collect generic constraints on the application of peer feedback | Elicit value norms and priorities relating to peer feedback from the stakeholders (dialogue with e.g., students, teachers, (board of) examiners, IT support, etc.).<br><br>Investigate variations of peer feedback with stakeholders on how these affect their values (impact assessment), e.g. by<br>- Interviewing<br>- Focus groups<br>- Value scenario's<br>- Mockup/prototype evaluation<br>- Harms & Benefits mindmap<br>- Ethical matrix<br><br>Relate value threats and tensions to design choices |
| **Develop** | Prepare the chosen configuration in such a way that data can be collected in future phases | Solicit advice from experts/colleagues on how to incorporate peer feedback in local context (course/systems) | Follow guidelines from literature for successful implementation of peer feedback (scripting) | Relate values and norms to peer feedback configuration choices |
| **Implement** | Perform pilot walkthrough(s) of the configured peer feedback system before going live | Request technical and pedagogical support in configuration of peer feedback system (regarding e.g. effectiveness & efficiency) | Use the scripting guidelines when configuring the system and syllabus | Relate values and norms to peer feedback implementation choices |
| **Evaluate** | Evaluate engagement with the LMS / peer feedback system and student achievement (grades) | Gather experiences of involved students and teachers, e.g., what did they consider beneficial, what should be improved? | Use validated instruments to measure effectiveness of the innovation and implementation | Evaluate impact of peer feedback on (direct and indirect) stakeholders |

In Table 1, we illustrate for this example case how the four types of evidence are iteratively collected and VSD is integrated in the process. During the *Analyze* phase, the envisioned problem is analysed by using local data, experience of practitioners with peer feedback and academic literature on peer feedback, not only to gain insight on workload, feedback quality and student performance (EIP), but also on moral

impact (VSD). To assess moral impact, an inventory is made of persons or groups that might be impacted by the introduction of peer feedback and what character that impact might have (e.g., positive impact on wellbeing of teachers because of less workload and on confidence of students because of additional learning opportunities, but maybe negative impact on assurance or privacy of students). In the *Design* phase, besides studying existing configurations and effectiveness of alternative configurations (EIP), stakeholders (teachers and students, but also examiners) are actively engaged and asked about how they experience alternative configurations (VSD), using techniques such as interviews, focus groups or experiments. In the *Develop*, *Implement* and *Evaluate* phases, evidence from data, practice and literature are used to assess alternatives and achieve not only an effective, transferable and scalable solution (EIP), but also a solution that respects human values (VSD).

## 6 Conclusion and Discussion

In this paper, we propose to integrate value-sensitive design with evidence-informed practice as a way to not only ensure effectiveness, transferability and scalability of educational innovations, but also a positive moral impact. Value-informed innovation extends evidence-informed practice with methods and techniques to actively take human values into account in the design process of educational innovations. Aligning well with a propagation approach, value-informed innovation extends the types of stakeholders to involve with relevant non-users and future users and it extends the topics to be discussed with human values.

The integration of VSD in EIP operationalizes what Cukurova et al. (2019) propose as a fourth type of evidence, besides scientific evidence ('what works why'), practice-based evidence ('what works where and for whom') and local evidence ('what happens in our school'): the perspectives and values of those people who are directly or indirectly affected. This, what we call value-based evidence, describes 'what is considered valuable by whom', relating implementations to human values of direct and indirect stakeholders.

Value-based evidence originates both from academic science (conceptual investigation) and practice (empirical and technical investigation). It appears that, though values are rightly considered a fourth type of evidence, value-based evidence is of a different order than the three others. Unlike scientific, practice-based and local evidence, value-based evidence can be sourced from all evidence sources: it can be derived from scientific literature, by elicitation from stakeholders in other contexts, and derived from local data and experience. Moreover, value-based evidence can (and should) be gathered from contexts in which implementation is not intended (yet) by incorporating the time and pervasiveness perspectives.

Our work is a conceptual and theoretical contribution on the integration of EIP and VSD to incorporate human values in the innovation process in educational practice. For future work, it would be interesting to test this proposed approach in real-life innovation projects, with the aim of concretizing the approach, to develop practical insights and guidelines and to evaluate and improve the ideas presented in this paper. Finally, we expect VSD can be integrated in a similar way in professional domains other than education with approaches that resemble EIP.

**References**

Andriessen, D. (2016). Drie misverstanden over onderzoek in het hbo weggenomen. Hoger Onderwijs Management, 05.

Appelman, N., Toh, J., & Zwart, H. de. (2021, July 6). Opinie: 'UvA, verhul racisme van proctoring niet met mooie woorden'. Het Parool. https://www.parool.nl/gs-baa188f7

Babüroglu, O. N., & Ravn, I. (1992). Normative Action Research. Organization Studies, 13(1), 019–034. https://doi.org/10.1177/017084069201300104

Baskerville, R., & Wood-Harper, A. T. (1998). Diversity in information systems action research methods. European Journal of Information Systems, 7(2), 90–107. https://doi.org/10.1057/palgrave.ejis.3000298

Branch, R. M. (2009). Instructional Design: The ADDIE Approach (1st ed.). Springer. https://doi.org/10.1007/978-0-387-09506-6

Brown, C., & Malin, J. R. (Eds.). (2022). The Emerald Handbook of Evidence-Informed Practice in Education: Learning from International Contexts. Emerald Publishing Limited. https://doi.org/10.1108/9781800431416

Brown, C., Schildkamp, K., & Hubers, M. D. (2017). Combining the best of two worlds: A conceptual proposal for evidence-informed school improvement. Educational Research, 59(2), 154–172. https://doi.org/10.1080/00131881.2017.1304327

Cukurova, M., Luckin, R., & Clark-Wilson, A. (2019). Creating the golden triangle of evidence-informed education technology with EDUCATE. British Journal of Educational Technology, 50(2), 490–504. https://doi.org/10.1111/bjet.12727

Davies, P. (1999). What is Evidence-based Education? British Journal of Educational Studies, 47(2), 108–121. https://doi.org/10.1111/1467-8527.00106

Ebbinghaus, U., & Bös, N. (2020, October 9). Upload, Spicken, Technikfehler: Die Tücken der Online-Klausuren. Frankfurter Allgemeine Zeitung. https://www.faz.net/aktuell/karriere-hochschule/hoersaal/upload-spicken-technikfehler-die-tuecken-der-fern-klausuren-16993134.html

Friedman, B., & Hendry, D. G. (2019). Value Sensitive Design: Shaping Technology with Moral Imagination. The MIT Press.

Friedman, B., Howe, D. C., & Felten, E. (2002). Informed consent in the Mozilla browser: Implementing value-sensitive design. Proceedings of the 35th Annual Hawaii International Conference on System Sciences, 10. https://doi.org/10.1109/HICSS.2002.994366

Friedman, B., Kahn, P. H., & Borning, A. (2006). Value Sensitive Design and Information Systems. In D. F. Galletta & P. Zhang (Eds.), Human-computer interaction and management information systems: Foundations (pp. 348–372). M.E. Sharpe. https://doi.org/10.1002/9780470281819.ch4

Froyd, J. E., Henderson, C., Cole, R. S., Friedrichsen, D., Khatri, R., & Stanford, C. (2017). From Dissemination to Propagation: A New Paradigm for Education Developers. Change: The Magazine of Higher Learning, 49(4), 35–42. https://doi.org/10.1080/00091383.2017.1357098

Harwell, D. (2020, November 12). Cheating-detection companies made millions during the pandemic. Now students are fighting back. Washington Post. https://www.washingtonpost.com/technology/2020/11/12/test-monitoring-student-revolt/

Hevner, A., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. MIS Quarterly, 28(1), 75–105.

Nelson, J., & Campbell, C. (2017). Evidence-informed practice in education: Meanings and applications. Educational Research, 59(2), 127–135. https://doi.org/10.1080/00131881.2017.1314115

Nevo, I., & Slonim-Nevo, V. (2011). The Myth of Evidence-Based Practice: Towards Evidence-Informed Practice. The British Journal of Social Work, 41(6), 1176–1197. https://doi.org/10.1093/bjsw/bcq149

Oosterlaken, I. (2015). Applying Value Sensitive Design (VSD) to Wind Turbines and Wind Parks: An Exploration. Science and Engineering Ethics, 21(2), 359–379. https://doi.org/10.1007/s11948-014-9536-x

Prinsen, F., & van der Stappen, E. (2021, November). Evidence-informed Template for Good Practices of Educational Innovation with Technology. Proceedings of EAPRL'21. EAPRIL 2021, Online.

Schildkamp, K., & Kuiper, W. (2010). Data-informed curriculum reform: Which data, what purposes, and promoting and hindering factors. Teaching and Teacher Education, 26(3), 482–496.

Scienceguide. (2022, February 9). Proctoring leidt op grote schaal tot faalangst. ScienceGuide. https://www.scienceguide.nl/2022/02/proctoring-leidt-op-grote-schaal-tot-faalangst/

Sein, M. K., Henfridsson, O., Purao, S., Rossi, M., & Lindgren, R. (2011). Action Design Research. MIS Quarterly, 35(1), 37–56. https://doi.org/10.2307/23043488

Singer, N., & Krolik, A. (2021, May 9). Online Cheating Charges Upend Dartmouth Medical School. The New York Times. https://www.nytimes.com/2021/05/09/technology/dartmouth-geisel-medical-cheating.html

Smakman, M., Vogt, P., & Konijn, E. A. (2021). Moral considerations on social robots in education: A multi-stakeholder perspective. Computers & Education, 174, 104317. https://doi.org/10.1016/j.compedu.2021.104317

van der Stappen, E., & van Steenbergen, M. (2020). The Ethical Matrix in Digital Innovation Projects in Higher Education. Proceedings of the 33rd Bled EConference, 485–498. https://doi.org/10.18690/978-961-286-362-3.33

van Steenbergen, M., & van der Spoel, I. (2021). Online Proctoring: Adding Human Values to the Equation. 34th Bled EConference Digital Support from Crisis to Progressive Change, 283–294. https://doi.org/10.18690/978-961-286-485-9