

Co-designing authentic assessment: The entanglement of design senses in a network of assessment design decisions

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Abstract

Assessment design often involves a collaborative effort among various stakeholders. However, numerous assessment frameworks still operate under the presumption that assessment design is primarily the responsibility of individual educators. Design methods for networked learning need to shift towards more collaborative approaches that bring together different perspectives and acknowledge the socio-material entanglement of human and non-human actants for a more inclusive educational future. In our work we advocate for co-design and place a strong emphasis on cultivating relationships and a decentralised decision-making process that challenges traditional power dynamics and hierarchies. Co-design represents both a mindset and a method distinguished by specific principles and procedures. In this paper we untangle the network of socio-material relationships in the co-design of authentic assessment for a large accounting capstone course in a business school. Students undertook this course during the last semester of their degree program. Rather than designing our assessment on an authentic real-world scenario, our assessment was a real-world task. We collaborated with an industry partner who needed to re-evaluate their business model to generate more revenue for their business. The students were tasked with developing a value-enhancing action plan for our partner's business model. In this paper, we use Actor-Network Theory (ANT) to trace the network of human and non-human actants in the co-design of this real-world assessment task. We describe this network through the Assessment Design Decisions Framework, which provides six key considerations for decision making: purposes of assessment, contexts of assessment, learner outcomes, tasks, feedback processes, and interactions. The concept of design is subject to ongoing debate, which holds significant implications for the future of educational design. We therefore explore the intricacies of design through the five design senses: 1) design as domain, 2) as process, 3) as plan, 4) as the resulting product, and 5) as intentional creation of new possibilities. We demonstrate that when co-designing assessment in higher education, the interrelationships among these five senses remain fluid, perpetually shifting, and emergent within a complex network involving both human and non-human actants. The conceptualisation of the five senses as a network represents a methodological standpoint that enables us to portray the complex interconnections of tools, competencies, roles, and relationships within our educational co-design project. Reframing design activities as a network allows us to modify parts of the network, leading to more sustainable designs.

Keywords

Co-design; Authentic assessment; Design senses; Actor-Network

Introduction

In this paper we untangle the network of socio-material relationships in the design of authentic assessment for a capstone course in a business school. The internet is replete with assessment guides and frameworks offered by many universities' learning and teaching departments to help educators in the process of assessment design. Numerous assessment frameworks operate under the presumption that assessment design is primarily the responsibility of individual educators. In practice, however, assessment design often involves a collaborative effort among various stakeholders. We concur with Latour in that "all designs are 'collaborative' designs – even if in some cases the 'collaborators' are not all visible, welcomed or willing" (Latour, 2008, p. 6).

In education, this collaborative effort delineated as co-design is defined as "a highly-facilitated, team-based process in which teachers, researchers, and developers work together in defined roles to design an educational innovation, realise the design in one or more prototypes, and evaluate each prototype's significance for addressing a concrete educational need" (Roschelle et al., 2006, p. 606). We place a strong emphasis on cultivating

relationships and a decentralised decision-making process that challenges traditional power dynamics and hierarchies (Cantore, 2018). We value the expertise, knowledge, and lived experiences of stakeholders involved in the co-design process.

Using Actor-Network Theory (ANT), we trace the network of actants in the co-design of authentic assessment for a large accounting course. Our conceptualisation of networked learning emphasises “connections between (human and non-human) actants – understanding learning situations as entanglements of people and things” (Networked Learning Editorial Collective, 2021 p. 316). We describe this network through the Assessment Design Decisions Framework (Bearman et al., 2016). Further, we illustrate how the five design senses [originally proposed in Dohn and Hansen’s (2018) clarification of conceptions and presuppositions]; 1) design as domain, 2) as process, 3) as plan, 4) as the resulting product, and 5) as intentional creation of new possibilities, are useful for making sense of large, complex, and multifaceted educational projects. We therefore explore the following research questions: what is involved in the socio-material network of actors and relationships when designing authentic assessment in large co-design projects? How are the five design senses entangled in this network? The paper will contribute a novel approach to exploring design in large educational projects that considers the collaborative and entangled nature of design work, illuminating the dynamic processes that involve human and non-human actants. In applying a networked approach to the analysis of assessment design, we follow Carvalho and Goodyear’s (2018) novel reframing of service design as produced through networks of multiple institutional and individual actors. We argue that the networks involved in designing for learning comprise entanglements of diverse human and non-human actants.

In the rest of the paper, we first explain what we mean by the entanglement of the five design senses, followed by our approach to using ANT. We then introduce the assessment design decisions framework and describe our context and the authentic assessment details. This is followed by a detailed analysis of the network of decisions in the co-design of the assessment. We conclude with a combined discussion and conclusion of the main points and call for a shift towards more collaborative approaches to design in higher education.

The entanglement of five design senses

The concept of design is subject to ongoing debate, which holds significant implications for the future of educational design. In illustrating the intricacies of design, Heskett presented a seemingly puzzling statement: "Design is to design a design to produce a design" (Heskett, 2002, p. 5). Remarkably, each use of the term "design" in this sentence conforms to proper grammar, yet each signifies a distinct aspect of the design process. Dohn and Hansen (2018) employed these varying interpretations of design to articulate the intricacies of the concept and to elucidate the diverse perspectives on design within education. Expanding on Heskett's proposition, they describe five senses of design: "as a domain, as a process, as a plan, as a product, and as the creation of learning opportunities through the realization of deliberate intentions" (p. 29).

When viewed as domain, design represents the overarching concept within the field. As process, design entails the creative act of shaping and giving form to a concept. Design as plan refers to the specific blueprint or outline that embodies this form, typically manifesting as a drawing or prototype. Design as the resultant product signifies the ultimate manifestation of the design endeavour, which can take the form of material, conceptual, or abstract expressions (Dohn & Hansen, 2018). Finally, design as the deliberate creation of new possibilities represents the conscious realisation of specific objectives. This fifth sense integrates the other senses, for, as Dohn and Hansen (2018) assert, it encapsulates the notion that the "*intentional creation* of new possibilities takes place through a *process* articulating the conscious intention into a *plan* which is then realised in a *resulting product*" (p. 27, emphasis in the original).

In this paper, we demonstrate that when co-designing assessment in higher education, the interrelationships among these five senses remain fluid, perpetually shifting, and emergent within a complex network involving both human and non-human actants. This perspective aligns with the observations of Dohn and Hansen (2018), who recognised that even after the creation of a blueprint plan, the process of negotiating with stakeholders can result in further modifications before the ultimate realisation of the design begins. Dohn and Hansen contend that, in practice, these senses are challenging to segregate. We concur and, in response, suggest framing these five senses as a network. We propose that the relationships among them should be examined considering the intricate intertwinement of human and non-human actors, which significantly influence the actualisation of educational designs. The conceptualisation of the five senses as a network represents a methodological standpoint that enables us to portray the complex interconnections of tools, competencies, roles, and relationships within our educational co-design project. We have written about this conceptualisation of the five design senses as a network elsewhere (Wardak et al., 2023). More details of the project are provided below.

Applying Actor-Network Theory in our context

Originally formulated by French sociologists Bruno Latour and Michel Callon in the 1980s (Callon & Latour, 1981), ANT has found applications in diverse domains, including education (Fenwick & Edwards, 2010). Storni et al. (2015) stress that ANT offers a valuable perspective to delve deeper into the collaborative nature of co-design. In this paper, we explore the application of ANT in untangling the intricate network of relationships in the co-design of authentic assessment. ANT served as a valuable methodological tool, enabling us to investigate the material practices embedded in the network of the five design senses within our co-design activities.

Our methodological approach drew inspiration from Latour (2007) in that a network "is a tool to help describe something, not what is being described" (p. 131). By considering an entity as a network, we gain the capacity to trace all its attributes and relationships, making it amenable to description (Latour, 2011). Adopting this framework allowed us to conceptualise the five senses of design as a network, which facilitated our analysis of how action is dispersed throughout these senses.

The assessment design decisions framework

Bearman et al. (2016) address the challenge of translating theoretical concepts in assessment and feedback design in higher education into practical application. The authors state that much of the current literature on assessment design focuses on institutional changes, which may not directly assist individual educators. The authors note that different decisions are made at different stages throughout the lifespan of a program across three levels: policy, design phase, and daily judgements. On the policy level, senior staff, often disconnected from students, make determinations such as maximum weightings for exams. The decisions on the design phase are made by educators who are responsible for courses and make choices on task types and activities. Lastly, the third level encompasses daily judgements by individuals like tutors who evaluate and grade students.

The authors introduce a practical tool, the Assessment Design Decisions Framework, developed to aid educators in creating or adapting assessments. This framework provides six key considerations targeted at the design phase of decision making: purposes of assessment, contexts of assessment, learner outcomes, tasks, feedback processes, and interactions. These six considerations are italicised when referred to in the analysis below to facilitate easier identification of the framework.

Our assessment co-design context

This study is part of a project at the University of Sydney Business School, which aims to revolutionise student learning in large courses by fostering connectivity between students, educators, industry, and the wider community. This transformation rests on three core principles: information engagement, connected participation and active learning, and authentic assessment and feedforward (Wilson et al., 2021; Bryant, 2022). The implementation of these principles is steered by the Business Co-design team that includes academic and professional staff in the roles of educational developers, learning designers, media specialists, evaluators, and support staff. Members of the Co-design team collaborate with the educators in the Business School to enhance the student learning experience by designing brand new courses and enhancing existing ones. Evaluation, conducted ethically in accordance with The University of Sydney guidelines, involves student surveys, focus groups, staff interviews, and coordinator discussions to measure the impact on the student experience.

In this paper we are analysing a network within a network. On the broader level, we analysed the interplay of the five design senses to untangle the dynamic shifts from one sense to the other throughout the different phases of the assessment design. To analyse the socio-material entanglements within this network, we employed the assessment design decisions framework, which attuned us to how assessment practices are distributed across complex assemblages of human and non-human actants. We applied this framework to explore the design of authentic assessment for a new postgraduate accounting capstone course at the University of Sydney Business School. The capstone was designed for a newly restructured Master of Commerce program at the school. Students would undertake the course during the last semester of their degree program. The capstone would not present new content to students, rather it was designed to consolidate student learning over the course of their degree program and culminate in a substantial research project. Student enrolment in the course was projected at 250 in its first year of offering.

The main requirement for the course on the policy level was to provide an opportunity for students to apply and demonstrate their knowledge and skills in an assessed collaborative authentic research project. One of the definitions for authentic assessment in the literature is "an assessment requiring students to use the same competencies, or combinations of knowledge, skills, and attitudes, that they need to apply in the criterion situation in professional life" (Gulikers et al., 2004). Rather than designing our assessment on an authentic real-world scenario, our assessment was a real-world task.

We collaborated with Sydney Analytical, which is the University's core research facility dedicated to material, chemical and biological analysis. Sydney Analytical is one of the University of Sydney's core research facilities, which provides state-of-the-art instruments and technical expertise. Most of their instruments and facilities are hired by external organisations, including museums and drug research companies.

In the assessment task, students were asked to present a value-enhancing action plan with detailed examination of Sydney Analytical strategy, operations and its ability to create value. Students also needed to develop key performance measures that would guide Sydney Analytical in implementing the plan and monitoring performance. Students could choose one of four foci: management and value-creation, management of risks and opportunities, strategic direction and value creation, and commercial capacities.

In the next section, we analyse the network of decisions and the entanglement of the five design senses in the co-design of authentic assessment for our capstone course.

The network of decisions in the co-design of a capstone assessment

We began the analysis of the network by mapping out all the assessment design decisions involved in the process on a Miro board. For practical and analytical purposes, we limit the analysis of network to the design phase of the decision making. The analysis of the five design senses is added in brackets to indicate how the assessment design passed through the various design senses in the network.

The initial assessment design, including the weighting for individual components, was approved on the policy level by the faculty curriculum team. Once approved, the course outline (fourth sense) was passed on to the course coordinator and the Business Co-Design team as a plan (third sense). This started the design phase (second sense) where the Business Co-Design team conducted weekly meetings with the course coordinator and a teaching assistant. On the policy level, the course outline was influenced by a set of capstone assessment design principles (fourth sense and fifth sense), or guidelines, which were also passed on to the design phase team for further incorporation of the principles into the design of the assessment (third sense). The capstone guidelines highlighted the need for students to engage with authentic work integrated learning experiences. In addition, authentic learning and assessment *tasks* were to be aligned with the *learner outcomes* (Bearman et al., 2016).

The *purpose* of the assessment (Bearman et al., 2016) was to enable students to apply, integrate and evidence their development or mastery of knowledge and skills attained throughout their degree program. To align our assessment to these goals (second sense), the design team contacted the Assurance of Learning specialist in the Business School to attend one of the design meetings. They provided advice on how and where student performance can be measured against the program learning goals. The design team then invited the Academic Director of Work-Integrated Learning in the School to provide advice on working with an industry partner. They suggested that we use a student project deed poll for working with Sydney Analytical to ensure that sensitive data remains confidential. They sourced the most recent copy of a deed poll from the Director of External Engagement at the School.

It was important to obtain *feedback* from students on their perceptions of the newly designed assessment (Bearman et al., 2016). Since the course was being designed brand new, with no former students, we opted to invite an alumna who completed the previous version of the capstone course prior to the restructuring of the Master of Commerce program. Using the capstone guidelines (third sense) and the information and feedback obtained from various stakeholders (second sense), we updated the assessment plan document (fourth sense).

The *context* for the assessment (Bearman et al., 2016) was developing a value-enhancing action plan for Sydney Analytical business model. To develop the assessment description, we held meeting with Sydney Analytical director, who suggested we visit their labs to gain a better understanding of their research facility and its context. At the same time, we started to design a collaboration framework (third sense) to scope the details of the student projects in terms of the resources needed and the responsibilities of the co-design team throughout the project. During the lab visits, we secured collaborator signatures on the collaboration framework (fourth sense) and gained access to Sydney Analytical raw performance data, which included records of their main revenues and losses to help identify where value-enhancement was needed in their business model.

Some of the decisions were influenced by the *interactions* (Bearman et al., 2016) of certain elements. For example, due to the pandemic and the unforeseen lockdowns, we decided to make the entire live case study available on the Learning Management System (LMS). Since most of the students were still not allowed to be on campus or visit the Sydney Analytical labs, we recorded interviews with members of the Sydney Analytical board of directors that would form part of the case study for the student projects (fourth sense).

The next step was to design the assessment description that would provide details of the tasks and requirements for the students (fourth sense). The project was staged into different phases where students would first submit a

proposal and after gaining feedback from peers and teachers, amend the project plan and submit a final project, including a presentation of the main findings (third sense). The top three teams would present their suggested solutions to the Sydney Analytical board of directors. The assessment description also mandated that students sign the deed poll before gaining access to the Sydney Analytical confidential data. We then finalised the design of the rubrics to articulate the expectations for the learning outcomes on the daily judgements level (fourth sense). Following this we designed the case study (second sense), which was built into the LMS, holding all the information students needed for their projects (third sense), including the Sydney Analytical interviews and confidential data, and the assessment description and link to the deed poll (fourth sense). As a last step, we designed an evaluation plan (fourth sense), which would guide a series of data collection points through the first semester when the course was offered to students in February 2022.

Figure 1 visualises the network of actions and the human and non-human actants involved in the process of designing this authentic assessment. The arrows indicate the flow of actions and inter-dependencies in decision making. For example, the capstone guidelines were influenced by the decisions at the policy level but were not amended by the Co-design team. Instead, they directly influenced the process in the design meetings and the resultant updated assessment. The evaluation plan similarly did not feed back into the process of design at this stage but will influence the future amendments in subsequent semesters. The connection with the Director of External Engagement was mediated through the Academic Director of Work-Integrated Learning. All other actants had multiple interactions and dependencies in the network.

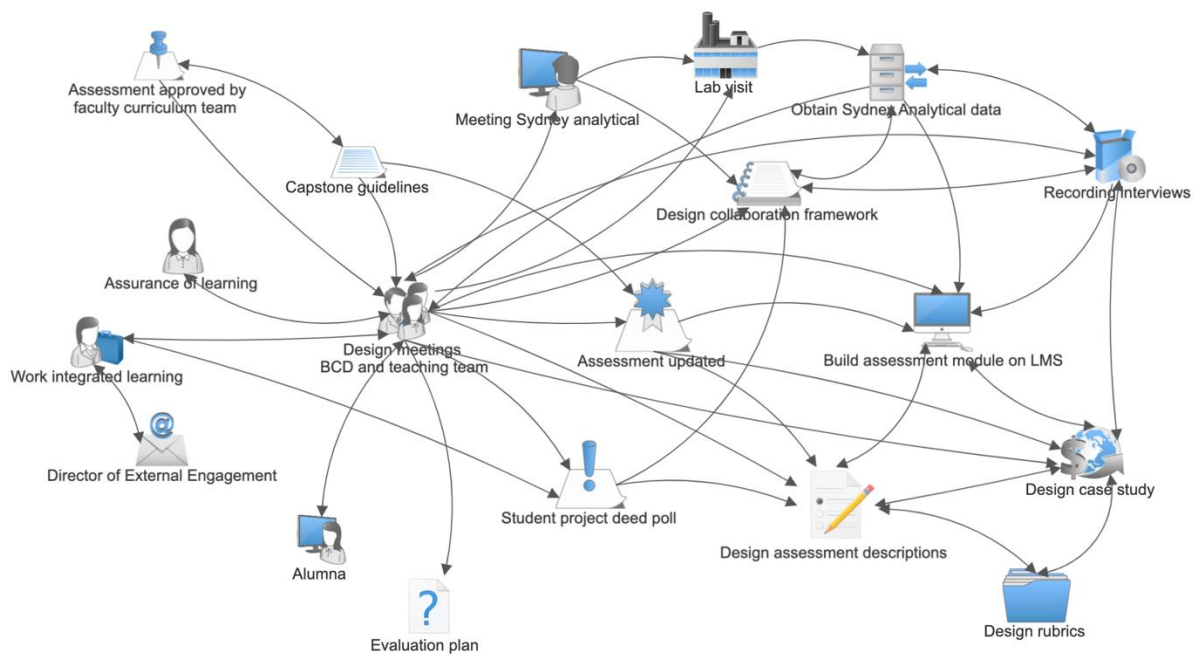


Figure 1: The network of decisions in the co-design of a capstone assessment

Discussion and conclusion

In this paper, we analysed the nested network of decisions and the entanglement of the five design senses in the co-design of authentic assessment using the assessment design decisions framework. We illustrated how authentic assessment needs to be co-designed as it requires the input of multiple stakeholders, including industry partners, work-integrated learning and external engagement staff, students, educators, media specialists, evaluators, educational technologists and designers.

Using the assessment design decisions framework, we mapped the network of actions across the key design decisions during the design phase. This analysis illustrated how the five design senses are entangled in a network of human and non-human actants. For example, the initial course outline was finalised by the faculty curriculum team in the previous stage on the policy level as a product (fourth sense) and was passed on to the Co-design team to be used as a plan (third sense). However, the Co-design team needed to update some elements in the plan as a result of feedback from the alumna, the requirement of the external engagement rules and regulations, the availability of technological tools and resources, and contextual factors such as the lockdowns due to the pandemic

(second sense). This means the course outline changed from a product (fourth sense) to a plan (third sense) to a process (second sense).

The capstone guidelines were also a product of design work on the policy level (fourth sense) but were then used as a plan to guide the further amendments to the assessment in the design phase (third sense). In addition, the capstone guidelines represented the intentional creation of new possibilities for authentic assessment in the Business School (fifth sense).

Readers would notice multiple instances in the analysis above that illustrates how the assessment design involved traversing between different design senses involving diverse stakeholders and a variety of resources during the design phase. Using ANT to untangle the network, we illustrate how human and non-human actants drive the design process. For example, the collaboration with Sydney Analytical was impacted by several contextual factors, people, and resources. When we began the initial conversation with the Sydney Analytical director, our plan was for the students to visit the labs to get a clear sense of the context and the environment. However, due to the restrictions placed on in-person visits to the labs because of the pandemic, we had to change the design of the case study. We decided to record the lab spaces and conduct interviews with Sydney Analytical board of directors and some researchers working in the labs.

As another example, the design of the assessment description had to be completed in stages because different actants and interactions needed to come to an alignment. For instance, the assessment description could not be created until the assessment was updated. We also needed the student deed poll to be approved by Sydney Analytical board of directors before mandating it as a compulsory task in the assessment description. The rubric had to be designed in tandem with the assessment description, each influencing the design of the other. The assessment description also needed to be embedded in, and influenced by, the design of the case study on the LMS. This is because we did not want to overwhelm the students by releasing the entire case study at once and decided to introduce the students to the Sydney Analytical context and the data in stages. This illustrates how ANT is useful in untangling the complex network of actions and relationships distributed across the design phase of the assessment. Furthermore, a “network perspective offers analytical tools to address the complexity of situations involving many possible combinations of heterogeneous elements. It allows us to delve into the interconnected elements, and to abstract part-whole relationships that may affect human activity (Carvalho & Goodyear, 2018, p. 32). Reframing design activities as a network “serves to help the educational designers learn how to modify parts of the network” (Carvalho & Goodyear, 2018, p. 34). This leads to more sustainable designs because it allows the identification of critical points and decisions, and the stakeholders involved in those decisions, for targeted and incremental changes.

Finally, readers might have noticed the absence of design as domain in the analysis (first sense). This is because we conceptualise the domain as co-design, which in the context of our work represents both a mindset and a method distinguished by specific principles and procedures (Manzini, 2015). Furthermore, the entire process of co-design was an intentional creation of new possibilities for students undertaking the capstone course in the School (fifth sense). Design methods for networked learning needs to shift towards more collaborative approaches that bring together different perspectives and acknowledge the socio-material entanglement of human and non-human actants for a more inclusive educational future.

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Acknowledgements

This research was conducted as part of the CLaS Project at The University of Sydney Business School. The authors would like to acknowledge the project lead, unit coordinators, students, educational developers, learning designers, media producers and project officers involved in the project.