Assessing student learning in transdisciplinary learning environments

Preliminary Research Proposal of Anke Swanenberg

Transdisciplinary learning prepares students to bridge the gap between academic knowledge and societal needs, where they can directly make a meaningful impact in society (Magnell & Högfeldt, 2016). Research shows that assessment plays a crucial role in shaping how students learn and engage with the learning process. However, there is a significant gap in our understanding of assessing student learning in transdisciplinary environments. The key question is how can we assess student learning in these settings in a way that not only measures their progress but also actively enhances their learning experience? Before we can answer this 'how-question', we need to explore the why and what of assessing student learning in transdisciplinary contexts.

Why, what and how?

Since more and more universities and universities of applied sciences (including Wageningen University) have transdisciplinary education explicitly in their educational vision, gaining more insight in why, what and how to assess student learning in these contexts is essential.

Why?

Assessment is the most important factor driving student learning and learning processes (Schellekens, et al., 2021), and therefore it is crucial to answer the 'why' question of assessment of student learning in a transdisciplinary context. The principle of 'assessment for distinctiveness' can be relevant to address this question. This principle emphasizes the importance of embracing diversity and individuality within assessment practices (Jorre de St Jorre & Johnson, 2021). A critical consideration is whether we aim to produce uniformity—where all students graduate with the same profile—or whether we prioritize fostering students' unique qualities and distinctions. This is a foundational question that underpins the purpose and design of assessment in education, particularly that of transdisciplinary education.

In addition to this foundational question, another critical consideration emerges: should our primary focus be on delivering high-quality, innovative products and creating external impact, or should the emphasis lie on prioritizing the learning processes of our students? While these objectives are not necessarily mutually exclusive, the balance between them reflects different educational values and priorities.

What?

To better understand the what of assessment, we need to consider which focus is most fitting for transdisciplinary student projects. The answer to the question raised in the paragraph before gives insight in what to assess: the quality of the end-product or the processes and skills within transdisciplinary projects, such as boundary crossing competences (Gulikers & Oonk, 2019). O'Sullivan (2024) argues that transdisciplinarity comes down to the development of two capacities: knowledge integration and actionable knowledge (O'Sullivan, 2024). According to this theory, it makes sense to focus with the assessment specifically on these capacities. Besides that, it is important to explore how to include personal learning goals and learning surprises in assessment (Scardamalia, Bransford, Kozma, & Quellmalz, 2012) (Baggen, Lans, & Gulikers, 2022).

How?

Assessment for & as learning (Schellekens, et al., 2021) seems an important concept for the how-questions. Assessment is in this theory not only seen as a means to measure performance, but also aims

to support and promote the learning process. Feedback and involving students in the assessment process are important elements for students to understand and improve their own learning.

Currently there is no research done about what types of assessment can benefit the learning process in transdisciplinary education. It might be beneficial to draw insights from related fields, such as assessment in interdisciplinary education, assessment for distinctiveness (Tai, et al., 2022), portfolio-based assessment, programmatic assessment (Baartman, Van Schilt-Mol & Van der Vleuten, 2020) and/or skills-oriented programs (e.g., teacher education), as well as internships or workplace learning. Additionally, the assessment of complex skills, such as creativity or innovation, could provide valuable perspectives for assessment of transdisciplinary learning.

Research questions and methods

This leads us to the following research questions:

- **Why** do we assess in transdisciplinary education: what are the primary purposes of assessment in these settings?
- **What** do we aim to assess in transdisciplinary education; what do we want to make visible with the assessment?
- **How** can we assess student learning in transdisciplinary learning environments, so that it contributes to the learning process of students, while also measuring their learning?

This research will be conducted in three phases, with these three questions serving as the central focus.

Phase	Objective	Research methods	Expected outcome
Phase 1. Foundation phase	This first research phase is about exploring the experiences of student learning within transdisciplinary education, addressing the fundamental question: Why, what and how is student learning in transdisciplinary education currently assessed? These questions are asked to the various knowledge institutes, to map the current status of assessment in transdisciplinary education.	• An extensive questionnaire, to as many universities and universities of applied sciences in the Netherlands • In-depth case studies, with semi-structured interviews and focus groups with diverse stakeholders to delve deeper into the unique challenges and effective practices in these contexts.	The expected outcome is a synthesized understanding of the current state of the why, what and how of assessment in transdisciplinary education, providing a foundation for designing an effective framework.
Phase 2. Framework design and development	To develop a practical assessment framework, with design criteria and a step-to-step guide of things to consider, that aligns with the why and what, focusing on the how and	• Educational Research Design, to co-create the framework with relevant	A co-created, validated framework for assessing students learning in transdisciplinary education, tailored to the needs of

	who of assessment in transdisciplinary learning environments. The goal of the framework is to help educational designers to design the assessment aligned with the why and what within transdisciplinary education.	stakeholders (teachers, students, assessment experts, educational designers, societal partners). • Validation with scientific insights and stakeholders.	educators and learners. In this framework the insights from the why, what and how should be merged, to provide teachers with insight in the relations between these questions and fitting advice based on their own answers to the why and what.
Phase 3: Framework implementation and evaluation	To implement and evaluate the assessment framework, examining its practical utility and impact on student learning in transdisciplinary settings in the design of different courses.	• Pilot implementation • Evaluation through observations, surveys and interviews with educational designers, teachers, students and societal partners.	A comprehensive evaluation of the framework's effectiveness in relation to the why, what and how, with practical recommendations for refinement and wider application.

The ultimate goal is to have a better understanding of the why, what and how of assessing student learning in transdisciplinary education, and the relation between these three aspects. From that insight we expect to create an assessment framework that not only aligns with the objectives of transdisciplinary learning but also helps educational designers and advisors to design transdisciplinary assessment in such a way that it fosters and measures the student learning processes.

This PhD project involves Anke Swanenberg (PhD Candidate), Perry den Brok (Promoter), Judith Gulikers (Co-Promoter) and Yvette Baggen (Co-Promoter).

Literature

Ajjawi, R., Tai, J., Nghia, H., L., T., Boud, D., Johnson, L., & Patrick, C.-J. (2020). Aligning assessment with the needs of work-integrated learning: the challenges of authentic assessment in a complex context. *Assessment & Evaluation in Higher Education*, 304-316.

Akkerman, S. F., and A. Bakker. 2011. "Boundary Crossing and Boundary Objects." Review of Educational Research 81 (2): 132–169. doi:10.3102/0034654311404435.

Albanesi, C., Compare, C., Guarino, A., & Pollack, S. (2022). *UNICORN. University Community Learning.* Bologna: Erasmus+ Programme.

Baartman, L., Van Schilt-Mol, T., & Van der Vleuten, C. (2020). *Programmatisch toetsen: voorbeelden en ervaringen uit de praktijk.* Amsterdam: Boom.

Baggen, Y., Lans, T., & Gulikers, J. (2022). Making Entrepreneurship Education Available to All: Design Principles fEducational Programs Stimulating an Entrepreneurial Mindset. *Entrepreneurship Education and Pedagogy*, 347-374.

Beemt, A. v., Watering, G. v., & Bots, M. (2023). Conceptualising variety in challenge-based learning in highereducation: the CBL-compass. *EUROPEAN JOURNAL OF ENGINEERING EDUCATION*, VOL. 48, NO. 1, 24–41. doi:https://doi.org/10.1080/03043797.2022.2078181

Bregt, A., Brok, P. d., & Pals, R. (2022). *WUR vision on Challenge-based Learning and Student Challenges.* Wageningen University.

Dochy, F., & Segers, M. (2018). Building block 7: Assessment as Learning. In F. &. Dochy, *Creating impact through future learning: The high impact learning that lasts (HILL) model.* Routledge.

Gao, X., Li, P., Shen, J., & Sun, H. (2020). Reviewing assessment of student learning in interdisciplinary STEM education. International Journal of STEM Education. https://doi.org/10.1186/s40594-020-00225-4

Gallagher, S., & Savage, T. (2020). Challenge-based learning in higher education: an exploratory literature review. *Teaching in Higher Education*, 1 - 23.

Gulikers, J. T., & van Benthum, N. M. (2014). Toetsen van competenties. In H. J. Berkel, A. Bax, & D. J.-t. Brinke, *Toetsen in het hoger onderwijs* (pp. 217-228). Bohn Stafleu van Loghum.

Gulikers, J., & Oonk, C. (2019). Towards a Rubric for Stimulating and Evaluating Sustainable Learning. *e A Holistic View of Sustainability Assessment in Higher Education: From Campus Operations to Curricula, Research and Outreach*.

HAN, R. (2021, 06). *HAN*. Retrieved from Wietske Kuijer nieuwe lector responsief beroepsonderwijs: https://www.han.nl/nieuws/2021/06/wietske-kuijer-nieuwe-lector-responsief-beroepsonderwijs/#

Jorre, J. d., T., B. D., & Johnson, E. D. (2021). Assessment for distinctiveness: recognising diversity of accomplishments. *Studies in Higher Education*, 1371-1382.

Khoo, S., Haapakoski, J., Hellstén, M., & Malone, J. (2019). Moving from interdisciplinary research to transdisciplinary educational ethics: Bridging epistemological differences in researching higher education internationalization(s). *European Educational Research Journal*, 18(2): 181-199.

Klein, J. (2004). Prospects for transdisciplinarity. *Futures 36*, 515-526.

Lackéus, M. &.-M. (2018). Assessing experiential entrepreneurship education: Key insights from five methods in use at a Venture Creation Programme.

Lackéus, M., & Williams Middleton, K. (2018). Assessing experiential entrepreneurship education: Key insights from five methods in use at a Venture Creation Program. *Experiential Learning for Entrepreneurship: Theoretical and Practical Perspectives in Enterprise Education*.

Magnell, M., & Högfeldt, A. (2016). *Guide to challenge driven education.* KTH.

Mobjörk, M. (2010). Consulting versus participatory transdisciplinarity: A refined classification of transdisciplinary research. *Futures*, 866-873.

Oonk, C. (2016). *Learning and Teaching in the Regional Learning Environment. Enabling Students and Teachers to Cross Boundaries in Multi-Stakeholder Practices.* Wageningen: Wageningen University & Research.

O'Sullivan, G. (2024). U-shaped learning: a new model for transdisciplinary education.

Pelgrim, E., Hissink, E., Bus, L., Schaaf, M. v., Nieuwenhuis, L., Tartwijk, J. v., & Kuijer-Siebelink, W. (2022). Professionals' adaptive expertise and adaptive performance in educational and workplace settings: an overview of reviews. *Adv Health Sci Educ Theory Pract.*, 1245-1263.

Philipp, T., & Schmohl, T. (2023). *Handbook Transdisciplinary Learning.* Bielefeld: Higher Education: University Teaching & Research.

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning & Teaching*, Vol.6 No.1.

Scardamalia, M., Bransford, J., Kozma, B., & Quellmalz, E. (2012). New Assessments and Environments for Knowledge Building. In B. M. P. Griffin, *Assessment and Teaching of 21st Century Skills* (pp. pp. 231-300). Springer Netherlands.

Schellekens, L., Bok, H. G., Jong, L. H., Schaaf, M. F., Kremer, W. D., & Vleuten, C. P. (2021). A scoping review on the notions of Assessment as Learning (AaL), Assessment for Learning (AfL), and Assessment of Learning (AoL). *Studies in Educational Evaluation*, Volume 71.

Schoot, M. v., & Sluijsmans, D. (2021). *Het dichtgetimmerde curriculum.* http://edukitchen.nl/het-dichtgetimmerde-curriculum/.

Schut, S., Maggio, L. A., Heeneman, S., Tartwijk, J. v., Vleuten, C. v., & Driessen, E. (2020). Where the rubber meets the road—An integrative review of programmatic assessment in health care professions education. *Perspect Med Educ*, 1-8.

Tai, J., Ajjawi, R., Bearman, M., B. D., Dawson, P., & Jorre de St Jorre, T. (2022). Assessment for inclusion: rethinking contemporary strategies in assessment design. *Higher Education Research & Development*, 1-15.

Tassone, V. C., Brok, P. d., Tho, C. W., & Wals, A. E. (2022). Cultivating students' sustainability-oriented learning at the interface of science and society: a configuration of interrelated enablers. *Interface of science and society*.