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Navigating the Terrain:

Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Efficient learning design: What do educators identify as key factors?

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This paper investigates the efficiency of assistant professors and postdocs' learning design interventions in connection with their participation in a teacher professional development (TPD) program (n = 62). Using the concept of Efficient Learning Design and a survey among educators, the efficiency of their designs is analysed, and the underlying factors are identified. The study shows that 92% (n = 57) of the design interventions had a positive impact, 73% (n = 45) had an impact equal to or higher than the required effort, and 8% (n = 5) made no significant difference or even had a negative impact. The paper identifies six factors for efficient learning design interventions based on the educators' responses. These include leveraging opportunities where teaching requires redesign, guiding educators on effective pedagogical methods, utilising peer feedback and collaboration, creating reusable, technology-supported activities and materials, supporting educators' design decisions and professional development, and ensuring a positive experience. Additionally, educators can benefit from a broad understanding of impact beyond improved learning outcomes.

Keywords: Learning Design, Efficient Learning Design, professional development, sustainable education, technology-enhanced learning

Background

In connection with a major revision of the university's teacher professional development (TPD) program for assistant professors and postdocs, Learning Design was introduced as the common development methodology to describe, share, and discuss university pedagogy (Dalziel et al., 2016), scholarly designs (Bennett et al., 2015; Felten, 2013), and reflect on the efforts and impacts of their interventions (Godsk, 2022). The goal of the latter was to avoid the erratic "Lone Ranger" and ad hoc approaches (Bates, 2000) and emphasise that there should be a sustainable balance between effort and impact over time justified by, for example, pedagogical aims, the educator's aspirations, and the institutional strategies (Godsk, 2022; Godsk et al., 2023). During the six months of the program, the educators developed and delivered their designs in their teaching, thereby gaining firsthand experiences and knowledge about the effort required to design and deliver the teaching and its impact. To raise awareness of the efficiency and sustainability of their design interventions, the program included a three-hour mid-term workshop where educators were introduced to the concept of Efficient Learning Design, defined as when the sum of student, educator, and institutional impacts is greater than the required efforts (Godsk, 2022).

During the workshop, the educators were asked to identify and justify key indicators of the efforts and impacts associated with their design and delivery, as well as actions to ensure a sustainable and desired balance. Later, the educators were to evaluate the actualised outcomes based on data on the chosen indicators. Through these evaluations, this paper addresses the question: What do assistant professors and postdocs identify as key factors for efficient learning design?

Methodology

To answer this question, an online survey was sent to all 125 participating assistant professors and postdocs from across the university during the program's spring 2023 and autumn 2023 deliveries. A total of 83 consented to have their responses used for the present research purpose and participated in the survey. Of these, 62 had the opportunity to implement their designs, measure the effects, and evaluate the actualised outcomes regarding the effort and impact associated with developing and delivering their pedagogical

development project. The outcomes were compared to a specified baseline, that is, a previous course delivery or the general norm on the study program, using a Likert scale from 'much lower' (-3) to 'about the same' (0) and to 'much higher' (+3). The evaluation also included open text fields where the educators could justify their evaluation and specify the efforts and impacts following the selected indicators and available data. Subsequently, these 62 responses were mapped according to reported higher or lower efforts and impacts (Figure 1) and inductively coded in NVivo to identify patterns related to effort, impact, associated outcome scenarios (i.e., the different colour clusters in Figure 1), and contributing or restraining factors for an efficient learning design. This process enabled the identification of underlying factors for the realised outcome scenarios and identifying representative quotes using matrix queries and meaning condensation (see Results section).

Results

Figure 1 maps the efficiencies of these interventions, and the underlying factors are further detailed in the following sections for each outcome cluster.

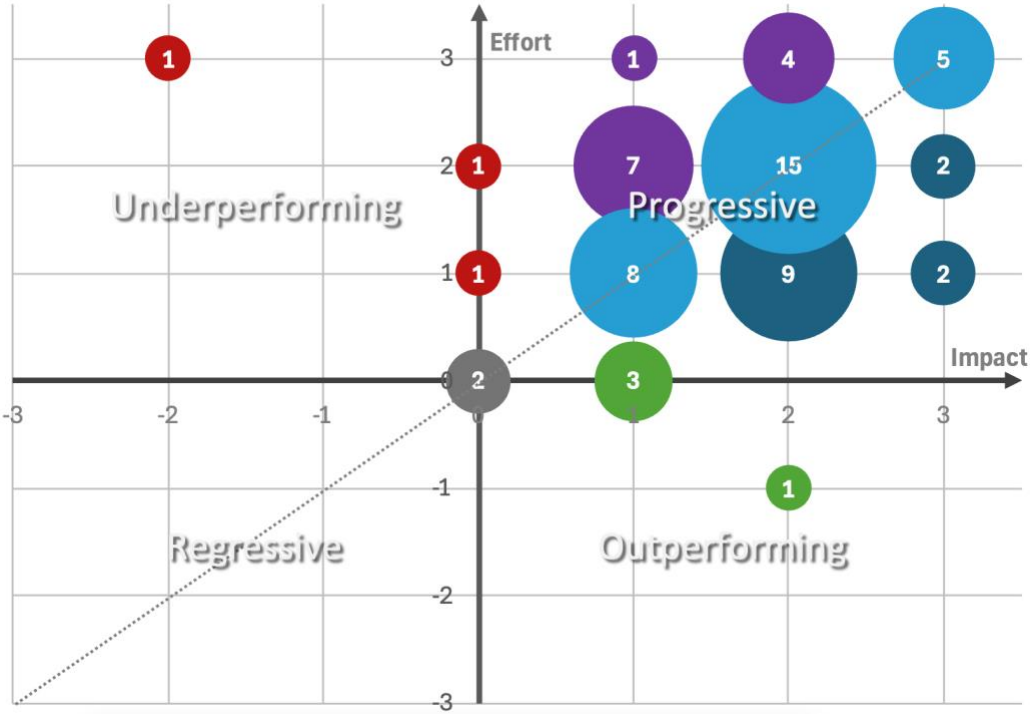

Figure 1. Learning Design efficiencies as reported by the educators. The number and size of the bubbles illustrate the number of interventions with the respective outcomes, and the colours illustrate their outcome cluster (see descriptions below). The diagonal represents "break-even".

Factors in outperforming design interventions

6% (n = 4) of the interventions achieved an overall positive impact on teaching and learning compared to their baseline with the same or less effort than previously, thus constituting an "outperforming" intervention (marked in green, Figure 1). The analysis of the interventions showed that this cluster did not immediately identify restraining factors and that mainly three factors contributed to this desirable outcome: a positive impact on teaching in the form of more active learning with engaged and involved students, a design that utilises peer learning through group activities and student presentations, which also reduces the educator's preparation time, and a pragmatic perspective that the teaching needed to be developed or updated anyway, and thus did not constitute increased effort.

> 'I would have had to design all elements of the course in any case, so it was not an additional effort to do this…' (Educator A)

> 'I used more group activities and less lecturing, and for me this results in less preparation time' (Educator B)

Factors in efficient progressive design interventions

85% (n = 53) of the interventions had likewise achieved a positive impact on their teaching and learning compared to before but at the expense of increased effort and therefore classified as "progressive". Of these, 28 reported that the impact just counterbalanced the invested effort (marked in light blue, Figure 1), and 13 noted a higher impact than the invested effort and thus qualified as "efficient" (marked in dark blue, Figure 1). That is a total of 66% of all the interventions. In the progressive interventions, the educators' time for educational development was the most restraining factor. This was particularly true for the educators who reported a break-even, with 71% (20 out of 28) indicating this as a restraining factor:

> 'Designing new teaching and learning, aligning with ILOs and exam forms, and activities took up a lot of time and energy. Experimenting with various group formations and the logistics of implementing exercises in practice.' (Educator C)

However, only 46% (6 out of 13) of the educators who reported a larger impact than effort indicated this restraint. Eight mentioned efforts associated with the implementation of technology-enhanced learning, and six mentioned their professional development as restraining factors, though typically with the expectation that this is an initial investment:

> 'I have implemented a series of educational technologies, each of which demands effort for the initial setup.' (Educator D)

Similar to the outperforming interventions, several positive pedagogical impacts were identified as factors for progressive efficient designs (n = 41). Notably, more active learning and engagement among students, as reported in 46% (n = 19) of the interventions, followed by an increased learning outcome at 20% (n = 8).

> 'The developmental project led to a rise in student attendance rates and a very substantial improvement in level of preparation among the attendees. This led to overall increased levels of academic discussions in the class.' (Educator E)

Additionally, 15% (n = 6) of the educators reported enhancing their teaching with technology, and 24% (n = 10) noted better coherence through improved structure, student guidance, and constructive alignment. Moreover, from the educator's perspective, 29% (n = 12) highlighted their professional development and the positive experience of designing and/or delivering the teaching as contributing factors — even in cases where the interventions had a minimal effect:

> 'I do not think that the developmental project per say [sic] improved my teaching - but some of the pedagogical tools that we learned and sparring with e.g. [my pedagogical supervisor] on how to handle course specific challenges made me reflect on (and hopefully) improve my teaching.' (Educator F)

Moreover, six of the educators in this cluster were explicit about the balance between efforts and impacts as well as sustainability, especially the five who achieved a larger impact than the required effort:

> '[The effort was] not too high, because it was planned to be cost-effective in relation to the teacher's workload.' (Educator G)

Factors in inefficient progressive design interventions

Twelve progressive interventions reported that the efforts were larger than the impact (marked in purple, Figure 1). For this cluster of "inefficient" interventions, the restraining factor was — similar to the break-even interventions — particularly the time spent on the development, which all the educators in this cluster indicated. This included developing more active teaching methods, organising group work and feedback activities, improving existing tutorials, and using educational technology for recording lectures and setting up online collaboration. Three educators noted that the increased effort was due to their professional development, including time for reflection, discussion with peers, and evaluation. However, three other educators noted that the high effort is not necessarily a problem and see it as an investment in future course deliveries:

> 'Anything that is done the first time has a large effort up front. I think if I kept it up, I would be able to make it reasonably sustainable. I don't view the effort for the first time as a problem.' (Educator H)

Thus, the increased effort is mainly due to the work involved in designing the teaching, but at the same time, there was a positive expectation that the impact would surpass efforts over time. The impact in this cluster is mainly attributed to three factors: students' active participation and better preparation, including more focus on intended learning outcomes, more coherent teaching, and a positive impact on students' learning outcomes.

> 'I think the students learned more than from a traditional lecture… as they were actively engaged and well-prepared. Based on the students' evaluations, they seemed to prefer the active learning over pure lecturing.' (Educator I)

Factors in underperforming design interventions

Despite increased effort, three interventions had no or negative impact on teaching and learning, characterising an "underperforming" intervention (marked in red, Figure 1). The educators highlighted a lack of sufficient knowledge or difficulty implementing and delivering the teaching as restraining factors.

> '[students] did not really prepare beforehand, so the [technology] part was wasted.' (Educator J)

> 'As the results of my development project show, students articulate that the perceived usefulness of peer feedback is significantly lower than teacher feedback' (Educator K)

Factors in neutral design interventions

Finally, two interventions resulted in no significant difference regarding efforts and impacts (marked in grey, Figure 1). The educators attributed this to their intervention not requiring significant effort or the course needing changes anyway, as well as an insignificant impact of the design. None of the educators had experienced a lower impact based on a lower effort, meaning that none of the interventions qualified as "regressive".

Discussion and conclusion

Looking at the outcomes, it is not surprising that 85% of the interventions were progressive, as one would expect that participation in a TPD requires increased effort (estimated 150 work hours), and the result would be better teaching and learning. However, it is surprising that four of the interventions were outperforming, as

this means that the educators achieved higher impact with a lower effort than previously, despite participating in the TPD. Together with the other interventions, they highlight six important factors for efficient — and potentially sustainable — learning design interventions, here phrased as recommendations:

1. Benefit from opportunities for interventions where teaching needs to be newly designed or redesigned anyway, thus not requiring educators to spend extraordinary time on the work.
2. Guide and support educators in basing their design on effective pedagogical methods for the given teaching context.
3. Benefit from peer feedback, student discussion, and collaboration to minimise educator time.
4. Design for a maintainable, long-term impact using activities and materials that can be reused in future course deliveries. In particular, technology-supported activities, online materials, examples and cases, and course structure were identified as reusable. Educators must recognise that the initial design is often more time-consuming, may require professional development, and have a qualified view of technology in education.
5. Ensure a positive experience and support educators in viewing educational development as an opportunity for professional development.
6. Be clear about the intended impact and desired outcome of the intervention. Educators can benefit from viewing impact as more than learning outcomes — e.g., student engagement, collaboration, communication, satisfaction, and their own positive experience with this work.

As can be seen, these factors are not only related to the design and its delivery — e.g., how it effectively supports pedagogical qualities such as student engagement, active learning, constructive alignment, etc. — but also to the educator's competencies and approach to educational and professional development (factor no. 4–6) and the opportunities for educational development in the given context (factor no. 1). In other words, TPDs must do much more than disseminate effective pedagogical methods and provide pedagogical training. They should also support educators in clarifying the goals and timing of educational development, support and influence educators' design decisions (Bennett et al., 2015), and discuss the role of professional development and the sustainability of their designs.

The primary limitations of this study include the number of participants, that the educators' suggestions for how their teaching can be (even more) sustainable have not yet been analysed, and the fact that the analysed efficiencies are self-reported, thereby carrying a risk of various biases related to the estimation of own competencies, performance, or efforts. However, a previous study in the same context demonstrates that this bias is only marginal (Godsk et al., 2023). These limitations will be addressed in future work, where more cohorts will be included in the analysis, along with follow-up interviews and observations of the actualised design and impact to validate the self-reported efficiencies and design characteristics.

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