Enhancing Learning Design through User Experience Research: Insights from a Survey in Four European Countries

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Abstract. *In this paper, we present preliminary results from a survey conducted in four European countries, focusing on learning design, specifically on the Balanced Design Planning (BDP) concept and tool. Our objective is to showcase the further development of the BDP concept and tool, based on user experience research. The survey involved 53 higher education educators and aimed to identify the key elements of effective learning design. Our findings emphasize the importance of learning outcomes and constructive alignment as crucial components of learning design. Additionally, we highlight the importance of design analytics and training opportunities in supporting educators in the preparation of sound learning designs. Through this research, we aim to contribute to the advancement of learning design practices and the improvement of the BDP concept and tool.*

Keywords. learning design, learning analytics, design analytics, learning outcomes, constructive alignment

1 Introduction

Learning design (LD) emerged in the early 2000s as a field that recognized the potential of the Internet for documenting and sharing effective educational practices (Lockyer, 2013). The rapid development of educational technology and the pressing challenges posed by societal shifts and the COVID-19 pandemic have placed a greater emphasis on digital education and resource sharing, making LD a highly relevant and vital topic (Divjak et al., 2022).

LD lacks a single definitive definition, but Koper and Olivier (2004) describe it as the application of a pedagogical model that aligns with learning objectives, while considering learner specifics, the learning context, and the subject of study (p. 98). Lockyer et al. (2013) further define LD as a practice that involves sequencing teaching practices, resources, and support developed by educators, while Conole (2012) views LD as a methodology that guides educators in making informed decisions about designing learning activities. Similarly, Bennet et al. (2015) emphasize the learner-centered nature of LD, highlighting the need for educators to design learning experiences based on students' needs and feedback.

Moreover, recent research by Rienties et al. (2023a) underscores the importance of investigating the conceptual and technological aspects of LD and their connections to learning analytics (LA). To address these considerations, Divjak et al. (2022) have introduced a new LD concept called Balanced Design Planning (BDP), supported by a freely available tool. BDP places a strong focus on contemporary learning theories, constructive alignment, aligning learning outcomes with teaching and learning activities in accordance with Biggs' constructive alignment theory (2006) and leveraging design LA.

This paper aims to present a portion of the preliminary findings from a survey amongst 53 educators conducted in four European countries (Croatia, Germany, Finland, the UK) during 2023, which sought to explore LD, particularly the BDP concept and tool and their further development based on user experiences. Through this research, we endeavor to contribute to the advancement of LD practices and provide insights into how educators can enhance their LD approaches to create effective and engaging learning experiences. The research was developed around the following research questions:

RQ1: What are the perspectives and experiences of different user groups in diverse contexts with LD and particularly the BDP concept and tool?

RQ2: What are the essential needs and areas for further improvement of the BDP concept and tool, depending on these different user groups and diverse contexts?

2 Background

The Balanced Design Planning (BDP) concept and tool (https://learning-design.eu/) have been developed through a rigorous process utilizing the design science methodology, incorporating insights from the Open University LD and contemporary research (Divjak et al., 2022; Rienties et al. 2023b). The initial phases of this work encompassed a comprehensive needs analysis, an extensive literature review and an exploration of the existing LD concepts and tools.

Subsequently, the development and initial enhancements of the BDP concept and tool were carried out in the second phase. To ensure its effectiveness and relevance, the validation activities were conducted primarily by higher education (HE) educators within sever.al Erasmus+ projects (RAPIDE, eDESK, Teach4Edu4 and iLed). Figure 1 illustrates the progression of this process, highlighting the piloting phase where the BDP concept and tool were put into practice. This study represents a step in the treatment validation phase of the design science cycle (Divjak et al., 2022).

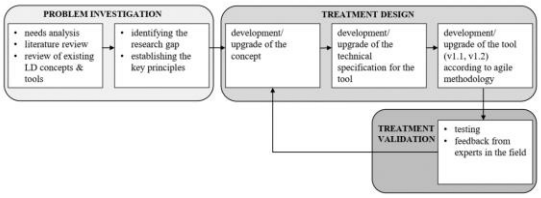

Figure 1. The BDP concept and tool design process. Source: Divjak et al. (2022). Balanced Learning Design Planning: Concept and Tool.

Currently, the BDP tool boasts of its impressive user base including over 1200 individuals from more than 30 countries worldwide. These educators represent diverse backgrounds, including schools, higher education institutions, lifelong learning providers, and industry professionals. The widespread adoption of the BDP tool underscores its versatility and applicability across various educational contexts and sectors.

In general, each course LD in BDP tool has four parts: Course Details, Planning, Analysis and Export (Figure 2).

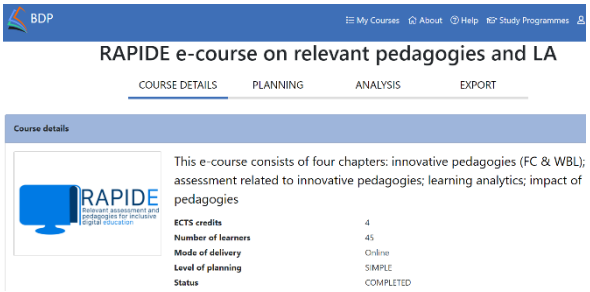

Figure 2. First page of a LD of a course in the BDP tool

3 Research design/Methodology

As part of the Erasmus+ project iLed (Learning Design in Higher Education), we conducted a comprehensive evaluation and collected feedback from a diverse range of users, including educators, instructional designers, technical experts, researchers, curriculum developers and educational decision-makers. This research aimed to address the specific needs of different international educational contexts. A wealth of studies have shown that implementing new EdTech in different cultures is not a one-size-fits-all approach (Reinecke & Bernstein, 2013; Rienties et al., 2023b; Rizvi et al., 2022). Indeed, recent preliminary findings from one study (Rienties et al., 2023b) using BDP showed subtle differences between how 86 Croatian, German, and UK educators reflected on the BDP tool and their subsequent intentions to implement it in their own context (Rienties et al., 2023b). Therefore, a research protocol was developed, approved by the relevant ethical committee, implemented and made publicly available on the iLed project website (iled-project.eu/).

While LD is not inherently tied to any specific learning theory or teaching approaches, the BDP concept and tool encourage educators to incorporate contemporary learning theories, such as constructivism, social constructivism, and connectivism, as well as innovative learning and teaching approaches. Therefore, the overarching goal of this study within the innovative iLed project was to further implement learning outcomes (LOs) and student-centered curricula through the development of an innovative LO-based LD concept and tool.

The study, led by the University of Zagreb's Faculty of Organization and Informatics (FOI) from Croatia, in collaboration with the Open University (UK), Goethe University (Germany), the University of Oulu (Finland) and the University of Zagreb's School of Medicine, began with the preparation of a research protocol and questionnaire.

The next step involved engaging evaluators from various user groups at each partner institution. These evaluators were introduced to the BDP concept and tool, within a so-called iLed onboarding e-course (https://learn.foi.hr/course/index.php?categoryid=9). There is some emerging evidence that onboarding could provide an effective approach to help educators to learn a new concept or approach (Frögéli et al., 2023). The evaluators were defined as users who had engaged with the BDP learning materials (videos and other learning materials in the iLed onboarding e-course or RAPIDE e-course) and/or had utilized the BDP tool to prepare LD of a course. Additionally, evaluators could also be users who had already used the BDP tool for at least two courses or for four hours. Once familiarized with the concept and tool, the evaluators completed the questionnaire and the data were collected and analyzed.

The evaluation focused on the diffusion of the LD concept and the acceptance of the BDP tool. To

measure technology acceptance, we utilized the Unified Theory of Acceptance and Use of Technology (UTAUT) framework (Venkatesh et al., 2003), incorporating specific questions related to the BDP concept and tool, as well as several open-ended questions.

The questionnaire preparation involved three stages (Figure 3), with the initial draft prepared by FOI in line with the conclusions from the iLed partners' meeting in December, 2022. Feedback was received from the project partners, leading to the preparation of the second version. The final questionnaire consisted of 36 questions, including 11 questions from UTAUT, 8 LD BDP tool-specific questions, seven open-ended questions, and questions related to socio-demographic data.

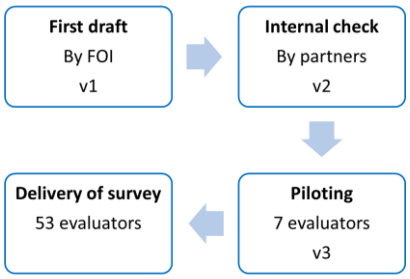

Figure 3. Stages of the preparation and delivery of the questionnaire

Prior to the survey delivery, the Ethical approvals were sought and obtained from the Ethical Committee at FOI and the OU Human Research Ethics Committee, encompassing the research protocol and questionnaire. Informed consent forms were added to the BDP tool, along with terms of service and Data Privacy Notice.

4 Results

In the survey conducted from February 2023 to May 2023, a total of 53 evaluators participated. Figure 4 provides an overview of their affiliations. The evaluators represented a diverse range of user groups, ensuring comprehensive coverage. While the majority of evaluators were educators and researchers, there was also active participation from instructional designers, learning designers, educational decision-makers, curriculum developers and technical experts.

As indicated in Figure 5, most educators were in general positive about the BDP tool and were broadly supportive in terms of technology acceptance. Overall, on average 46% of educators indicated a positive perspective about the BDP, while 6 of educators were neutral, and only 1 of educators was negative. It is noticeable that most educators (93%) believed that planning of assessment based on learning outcomes contributed to the quality of their work (LD_BDP3). Relatively the least support was given to the notion of weighted learning outcomes (LD BDP 1) whereby only 73% of educators supported this notion.

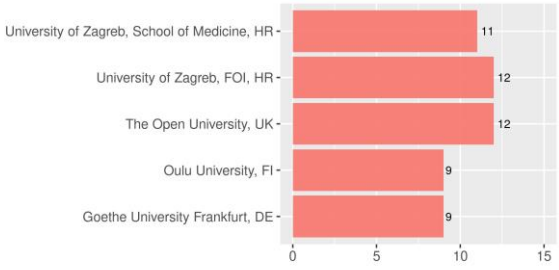

Figure 4. Number of evaluators per iLed partner institution

Here we will present a range of preliminary results from the survey that are directly related to upgrading of the BDP concept and tool (8 questions and open-ended questions).

The questionnaire included the following questions:

1. LD BDP 1: In my opinion, a learning design that is based on WEIGHTED learning outcomes improves the quality of my work as an educator.
2. LD BDP 2: I believe that planning of teaching and learning activities based on learning outcomes contributes to the quality of my work as an educator.
3. LD BDP 3: I believe that planning of assessment based on learning outcomes contributes to the quality of my work as an educator.
4. LD BDP 4: I believe that the choice of analysis available in the BDP Analysis (part of the tool) contributes to the quality of my work.
5. LD BDP 5: I find planning of teaching and learning activities in the BDP tool useful.
6. LD BDP 6: I find data presentation and visualization in the BDP Analysis (part of the tool) understandable.
7. LD BDP 7: I find data presentation and visualization in the BDP Analysis (part of the tool) useful.
8. LD BDP 8: I find the export possibilities (to pdf and to excel) useful for productivity of my work.

Open-ended questions:

1. FUNC USEF+: Which functionalities of the BDP tool do you find the most useful?
2. FUNC USEF-: Which functionalities of the BDP tool do you find the least useful?
3. AVAR -: If you would imagine the average user, what do you think they will struggle most with?
4. MISS <6: Which functionality/ies do you really miss in the BDP tool that we should prioritize in the next 6 months of development?
5. MISS >6: What are your suggestions for further improvements of the BDP tool beyond the 6 months period?
6. What type of evidence will you seek or consider when deciding whether to continue using your BDP learning design in future years?
7. Please, add any other comment about the BDP concept and tool.

The analysis of the qualitative answers on open-ended questions was performed as follows: Review of

answers; Defining categories in line with reviewed answers (Course details, Planning, Analysis, Export, Constructive alignment, Learning outcome (defining, weighting), Sharing/Collaboration, Advanced option, Concept (understanding, terminology, structure), Help (tooltips, literature, videos…), Learning types, User interface and technical implementation, General) and Classification of answers into categories (Appendix: Table 1).

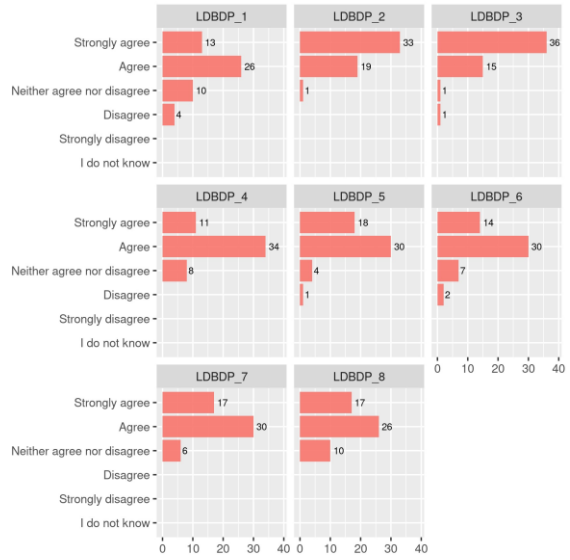

Figure 5. Frequencies of answers on the BDP tool related questions

Comments on FUNC USEF+ "Planning takes time, but quickly shows me the results." "Visualization which enables connection of learning outcomes with the weight of TLA." (Participant 46, Professor Croatia), "The possibility of linking learning outcomes to both activities and assessments." (Participant 2, Researcher, UK), "Planning the TLA units and comparing to the analysis dashboard." (Participant 37, Educational decision-maker, Finland), "Workload visualizer - succinct breakdown of activity types and timings (Participant 34, Instructional designer, learning designer, UK)".

FUNC USEF- "I think they're all useful, but I do wonder how we estimate the timings for activities. (Participant 42, Instructional Designer, UK) ", "I am confused by the concept of difficulty of learning outcomes"(Participant 10, Professor, Croatia), "For me personally, so far I'm not really sure how I could effectively use the analysis part" (Participant 30, Researcher, Finland), "Difficult to comment as I did not understand all of the training"(Participant 31, Researcher, UK).

AVAR- "Creating and weighting learning outcomes" (Participant 34, Instructional Designer, UK), "There's clearly a learning curve, to get into the model of working initially, understand the activity types and what type of data to input. This may differ to the user's mental model of course creation or their past experience. A possible way to provide additional support could be to provide examples or case studies." (Participant 12, Educational decision-makers, UK)," Drawing conclusions from the graphs to adapt the teaching" (Participant 40, Educational decision-makers, Germany), "constructive alignment with LOs and estimation of student workload" (Participant 17, Researcher, Croatia).

MISS<6 "It should be possible in the BDP Tool at the TLA level to assign specific tools or media that are used to implement the TLA.... Ideally, these should be activities that can then also be found in the Moodle …." (Participant 11, Instructional designer, Germany) , "Collaboration and feedback from students" (Participant 25, Curriculum Developer, UK) , "The alignment of the BDP tool with the constructive alignment approach (this is only somewhat achieved in the advanced option, but this is not the default option when creating the course)" (Participant 4, Curriculum developer, Croatia), "A wizard or chatbot that guides you in formulating LOs would be very useful. For example, with instructive verbs to choose from that correspond to elements from Bloom (Participant 49, Researcher, Germany)", "... to have also teacher workload, which depends on learning activities that are chosen for the course." (Participant 29, Researcher, Finland).

MISS>6: "Indication if there is a bigger inconsistency in learning design - e.g. weight of learning outcome is very different from the investment of student workload or assessment points. (Participant 9, Researcher, Croatia)", "Automated creation of a Moodle course with the planned activities from the BDP tool (Participant 47, Instructional designer, Germany)".

Other comments: "It's a great looking tool, and I like the way it channels you towards considering activities and constructive alignment." (Participant 8, Instructional Designer, UK), "The BDP concept is good and doing the course has made me aware of the importance of careful alignment of the learning outcomes to the learning design. It also adds evidence to the efficacy of chosen learning activities and where changes may be needed. Also, it helps to evaluate the student experience." (Participant 13, Educator, UK), "Ease of the new course design by utilizing the templates available with the tool." (Participant 46, Educator, Croatia), "evidence for better efficiency of student learning outcome achievement compared to standard classical teaching methods" (Participant 32, Curriculum Developer, Croatia), "The aspect of supervision by the teacher should be given greater consideration (not just: teacher is present vs. is not present). Especially in online settings… (Participant 11, Instructional Designer, Germany)".

5 Discussion

Diversity of evaluators enriched the study by incorporating various perspectives and expertise from different educational roles and domains.

RQ1: What are the perspectives and experiences of different user groups in diverse contexts with LD and particularly the BDP concept and tool?

In general, educators of different user groups and contexts were satisfied with the BDP concept and tool (RQ1). Even though they emphasized that the planning takes time they are happy with the functionalities, analysis, visualizations and collaboration and enhancement possibilities. Nevertheless, there are areas for further improvement of the BDP concept and tool (RQ2). Quantitative analysis revealed that while the concept of LD based on weighted LOs is accepted, it is not fully implemented in practice. Some educators do not utilize the LO-based approach, despite it being the foundation of student-centered teaching. They often struggle with prioritizing learning outcomes. Although many evaluators expected the LO-approach to be challenging for their colleagues, they recognized the value of planning teaching and learning activities (TLA), including assessment, based on learning outcomes in enhancing the quality of their work. However, some evaluators expressed concerns about the time-consuming nature of TLA planning and suggested the introduction of shortcuts or pre-defined templates.

Some evaluators pointed out the difficulty with shifting from educator-workload mode and scheduled activities such as lectures, seminars and tutorials to student workload mode and estimation of time an average student needs to fulfill the task.

Regarding learning analytics, specifically the design analytics available in the BDP tool, evaluators largely believed that the choice of analysis contributes to the quality of their work. However, some faced difficulties in understanding data presentation and visualization, as well as the perceived usefulness of design analytics. In open-ended responses, evaluators frequently mentioned the Analysis part as one of the most useful functions, expressing their concerns about their own and their colleagues' ability to utilize analytics for constructive alignment and assessment improvements, and seeking improvements in clarity and additional support. Here we recognize need for further development of educators' data and assessment literacy.

It is important to emphasize that aligning an assessment program with weighted intended learning outcomes is crucial for ensuring its validity. Assessment literacy is essential for educators and other stakeholders in education to competently evaluate the acceptability of assessments and effectively utilize assessment learning analytics for improving learning and teaching. Finally, evaluators found the export capabilities (to PDF and Excel) useful for enhancing their productivity.

Some evaluators pointed out that they share the LD with students and that it can be useful to collect students' feedback directly in the BDP tool.

Finally, the export possibilities (to pdf and to excel) they found useful for productivity of their work. In this context, some mentioned quality assurance and accreditation processes.

In answers in open-ended questions, evaluators often suggested that training opportunities need to be broaden and essential concepts related to learning design (LOs, constructive alignment, validity of assessment etc.) further explained.

6 Concept of the BDP LD

The BDP LD is built around several main concepts: learner-centeredness, constructive alignment, feedback to learners, validity and acceptability of assessment as well as technology supported learning (Table x).

Basic building elements include learning outcomes as a focal point, content and structural notions such as topics, units and TLA, types of TLA (acquisition, discussion, practice, investigation, production, assessment), type of assessment, duration and time on tasks as well as technology and delivery plans.

We define enablers as tools, skills and support that enable implementation of main concept for designing learning by using the basic building elements. Enablers include design analytics based on prioritization of LOs, educators pedagogical and digital skills, necessary resources for implementation of meaningful LD, assessment literacy of educators and learners, use of credits (e.g. ECTS) for measuring student workload as well as data, digital and AI literacy of all educational stakeholders. Stakeholders encompass learners, educators, educational leaders and authorities as well as industry and socially at large. They need to co-create quality learning based on LOs by using LA, adequate training means and resources supported by technology.

Finally, for the quality assurance of learning design as well as learning and teaching all stakeholders and interfaces to other systems need to be assured.

The COVID-19 pandemic has emphasized the significance of innovative pedagogical approaches such as Inquiry-Based Learning and Flipped Classrooms (FC) (Divjak et al., 2022c).

Therefore, learning design in digital era demands highly competent educator that can integrate innovative pedagogies with technologies (e.g. AI) and work in the international environment. Therefore, Rienties et al. (2023a) highlight the significance of cross-institutional and cross-national online professional development initiatives. Collaborative efforts among educators facilitate the sharing of best practices and innovative approaches, leading to continuous improvement in academic teaching.

Students' acceptance of learning design is crucial and therefore student feedback on learning design need

to be assured. For that, different means can be used such as direct students' access to LD tool providing feedback or integration of LD into learning analytics dashboards. Namely, students highly value features that aid short-term planning and organization of learning, (Divjak et al., 2023b) and therefore could be motivated to provide feedback. The upgraded BDP learning design concept is presented on Figure 6.

Table 2. Learning design concept elements

Basic building elements	**Main concepts**	**Enablers**	**Stakeholders' activities and interfaces**
LO	Learner-centeredness	Design analytics Prioritization of LOs	Educators' collaboration with peers
Topic	Constructive alignment	Pedagogical skills Digital pedagogies	Learners' feedback on learning design
TLA Type of TLA	Feedback to learners	Resources	"Interoperability" with LMS (e.g. Moodle)
Assessment	Validity and acceptability of assessment	Assessment literacy	Learning analytics integrated with design analytics
Time on task	Student workload	Credits (e.g. ECTS)	Training possibilities and support (e-course, OER, FAQ)
Technology and delivery models	Technology supported learning (TSL)	Data, digital and AI literacy	QA of teaching and learning (TL) in cooperation with educational leaders and society

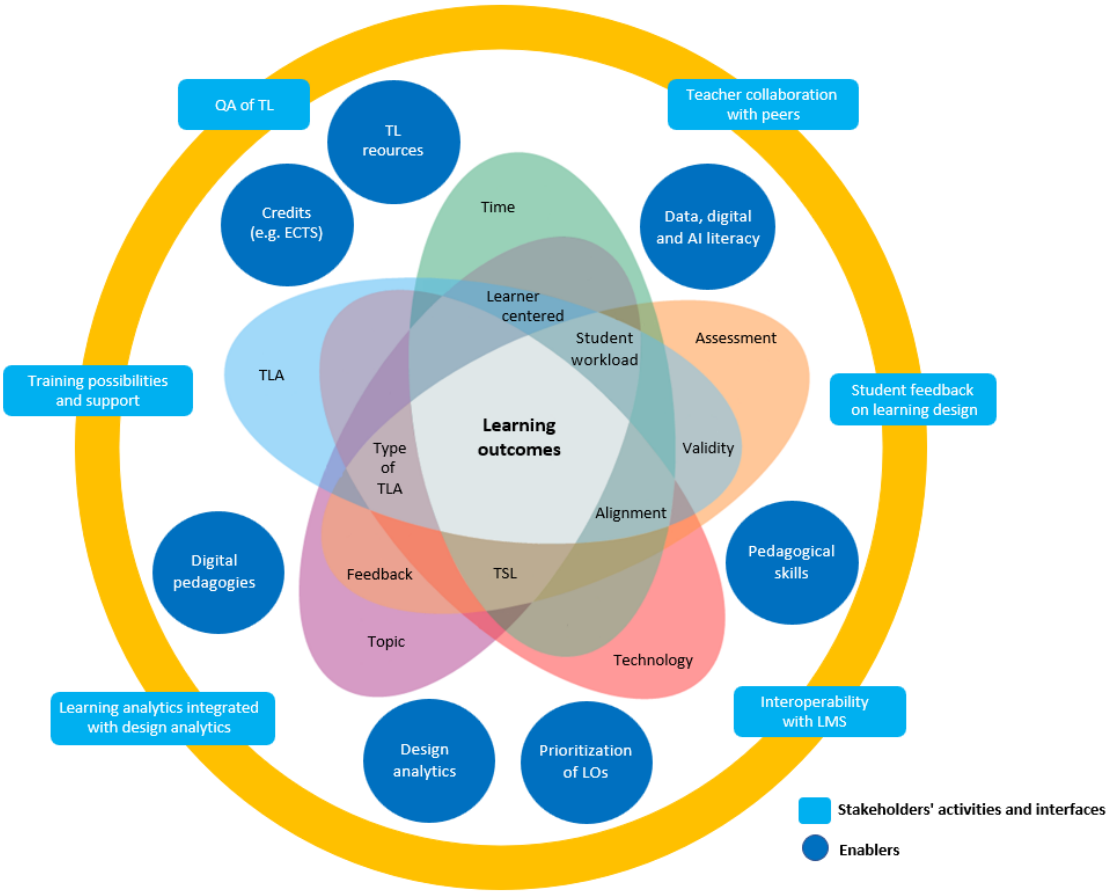

Figure 6. The upgraded BDP learning design concept

7 Conclusion

The concept of learning design (LD) lacks universal acceptance, as there are various approaches and perspectives within the field. However, in our study, we have developed a specific LD concept and tool called Balanced Design Planning (BDP) based on contemporary learning theories, learner-centered approaches, and the constructive alignment of intended learning outcomes (LOs) with teaching and assessment. The BDP concept emphasizes the importance of designing learning experiences that align with intended LOs and promote effective instructional strategies.

In our study, within Erasmus+ iLed project, we conducted a thorough user experience analysis of the BDP concept and tool. This report presents preliminary findings regarding the feedback received from 53 educators across four European countries. The aim of the analysis was to identify potential areas for improvement in the BDP based on their input.

Findings pointed out that more clarity in learning design elements, concepts and enablers are needed.

It also highlights the role of design analytics and resources in supporting educators in their LD practices. Continuous educator training, especially in areas such as LD and assessment literacy, is essential for informed decision-making and enhancing student learning outcomes.

The upgraded BDP learning design concept is proposed.

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Appendix

Table 1. Classification of answers into categories

	Course details	**Planning**	**Analysis**	**Export**	**Constructive alignment**	**Learning outcomes**	**Collaboration**	**Advanced option**	**Concept**	**Help**	**Learning types**	**User interface / Technical implementation**	**General**
FUNC USEF+	2	9	**26**	1	6	8	1	0	4	1	1	4	1
FUNC USEF-	0	**4**	**4**	2	1	3	0	**4**	**4**	0	1	0	1
AVAR-	0	2	2	0	10	**16**	0	0	**12**	3	2	4	3
MISS<6	0	0	4	1	1	0	1	2	**16**	5	0	**14**	0
MISS>6	0	4	0	0	1	1	0	3	5	**8**	0	**7**	2