



Delft University of Technology

## Holistic design pedagogies

### BSc Bouwkunde curriculum renewal experiences

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## **Proceedings – Full Papers**

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Eugenio Bravo-Córdova,  
(Editors)

# **HOLISTIC DESIGN PEDAGOGIES: BSc BOUWKUNDE CURRICULUM RENEWAL EXPERIENCES**

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## ABSTRACT

This practice paper deals with the curriculum renewal of the Bachelor's *Bouwkunde* program of the Faculty of Architecture and the Built Environment, TU Delft. It focuses on design education as a form of CBL and its pedagogical fundamentals in particular. The paper describes the program and the intentions for curriculum renewal, followed by an explanation of the new learning objectives and assessment strategy. Finally, it touches upon the team development process and lessons learned so far.

Holistic learning objectives and a holistic assessment strategy were developed to foster the curriculum renewal objectives and accommodate the integrative nature of design, design thinking, and design education. The design program's learning objectives are based on four strongly related skills that were further detailed for every course: position, knowledge, research, and communication. To do justice to the importance of coherence and interaction between these four different parts, design needs to be assessed holistically. At an abstract level, aspects that count for all spatial designs were formulated, no matter how different they appear in various design outcomes: coherence & meaning, correctness & elaboration, communication, and research. However, they are strongly connected and are hard to assess independently.

In the academic year 2024-2025, the renewed learning objectives and assessment strategy are used in education practice. We expect these will help to address the essence of developing and assessing (design) proposals to intervene in complex systems. Its use will be actively monitored, and the outcomes will be used to improve next year's curriculum.

## 1. INTRODUCTION

### Curriculum renewal

In 2022, the TU Delft Faculty of Architecture and the Built Environment decided to update its Bachelor's *Bouwkunde* Program (BSc Architecture, Urbanism and Building Sciences) after ten years of intensive use (Hoekstra et al., 2023). The ambition of the broad bachelor's program is to educate students to become "skilled, academic and context-aware designers of the built environment" (ibid: p31). Design education (*Bouwkundig ontwerpen*) is one of the fundamentals of the program and integrates architectural, landscape architectural, urban, and building technological design thinking. The design of the (un)built environment is full of socio-spatial challenges that our students are confronted with during their studies: the climate crisis, the housing crisis, the urban inequality crisis, and the scarcity of resources crisis, to name four important ones (Van Gameren, 2021). The *Bouwkunde* discipline and pedagogy itself have shifted towards interdisciplinarity and transdisciplinarity. Also, technological developments in the field of design and the field of teaching and learning urged us to reconsider our pedagogies.

### Design education

The bachelor *Bouwkunde* design education – particularly the second and third-year program – is challenge-based (Cavallo & Quist, 2023; Rooij & Mooij, 2022, 2024). Design challenges come from practice or are developed in collaboration with stakeholders from practice. The definitions of the design challenges need reinterpretation and positioning by the students. The

intended project outcomes are not fully clear at the beginning of the project. The design process and the working method must develop and settle over time. There are different ways how students collaborate. The roles of teachers are diverse.

Designing is a layered and complex skill (Van Dooren, 2024; Lawson & Dorst, 2009). It is open-ended: there is an endless solution space. It can be 'vague'; very often, it is goal searching and not always goal-oriented. Many things that need to be integrated into the design are unknown initially; they are 'discovered' during the design process, such as form, space, material, function, situation, and societal context. In design, one works at and across several spatial and temporal levels: from building detail to regional landscapes, from here and now to far in the future. Design is personal and has different (cultural) traditions; there are many design approaches and methods. At the same time, certain generic elements can always be found in design processes (Van Dooren, 2020). We aim for students learning to master and maneuver within this field.

### **Problem to address**

In our faculty, we heard quite some complaints about the (inter)subjective nature of design assessments. Students often had a hard time understanding the process and outcomes of design assessments. Our design project coordinators and design tutors - tenured university teachers, external practice teachers, individually or paired in teams - feel responsible for coming to fair and transparent assessments but do not always have the knowledge, experience, language, or tools to do so. Also, the curriculum lacked an explicit, well-structured, aligned, progressive, and systematic assessment approach for all design projects in the curriculum. In the recent bachelor renewal, this issue was taken up by the team that had to renew the Design program, first and foremost, by reconsidering its fundamentals: the learning objectives, assessment structure, assessment criteria, and the language used to present and explain these to students and staff.

### **Paper objective and structure**

This practice paper's objective is to present the curriculum team's decisions and discussions regarding the descriptions of the learning objectives and assessment strategy of the Design program (*leerlijn*) within the BSc *Bouwkunde* degree program renewal. The following section presents more information about the program and the intentions for curriculum renewal. In the results section, we explain the learning objectives and assessment strategy's why, what, and how. We will also briefly touch upon the team development process. The concluding section will present our lessons learned and the next steps.

## **2. CONTEXT**

### **BSc *Bouwkunde* at TU Delft**

The TU Delft Faculty of Architecture and the Built Environment has one broad, 3-year bachelor's degree program taught in Dutch. There is a Numerus Fixus of 450 students, and about 1400 students are enrolled in the program. The renewed program (Figure 1) that started in September 2025 for all study years and cohorts has five so-called Throughlines (*Leerlijnen*):

**Design** (*ONtwerpen*): six 10-EC design project modules that culminate in a bachelor final project (*Bachelor Eind Project*) consisting of two connected, integral design projects (*Integrale Ontwerp Projecten*)

**Technology** (*TEchnologie*): five 5-EC modules focusing on the technological dimensions of construction and the built environment, such as systems thinking, circularity, physics, mechanics, climate design, etc.

**Fundamentals** (*GRondslagen*): four 5-EC modules focusing on basic concepts in architecture, urbanism, and landscape architecture, past-present-future thinking, and spatial morphological analysis approaches.

**Society** (*MAatschappij*): three 5-EC modules focusing on studying topical socio-spatial challenges such as climate change, urban resilience, spatial justice, livability, and energy transition that spatial designers work on.

**Science and Skills** (*Wetenschap en Vaardigheden*): six 5-EC modules focusing on *Bouwkunde* as a scientific design discipline within the engineering sciences and the academic skills that accompany it.

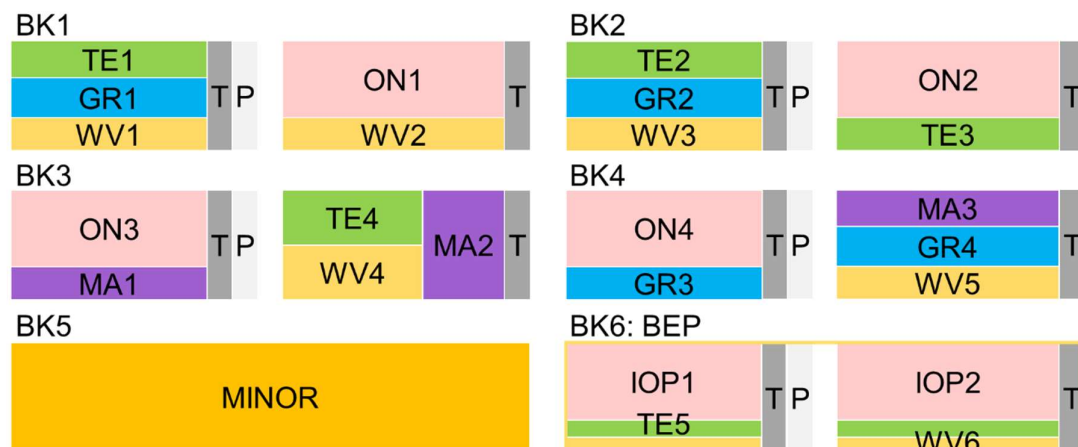


Fig. 1. Curriculum renewal scheme; three study years, four quarters per year, six throughlines, 24 modules, 30EC minor, T-weeks, P-weeks.

Each quarter has a week for tests, exams, and submission moments. Twice a year, a Personal Development Week (Bohm et al., 2023) is offered in which students can freely choose an activity that supports reflection on their personal learning and professionalisation journey.

Each module has a coordination team of two colleagues, ideally from two different Departments: Architecture, Urbanism, Architectural Engineering & Technology, and/or Management in the Built Environment.

### Curriculum renewal objectives toward CBL

Three curriculum renewal objectives (Hoekstra et al., 2023) have direct relations to CBL thinking: “Strengthen a more academic attitude via stimulating critical reflection and enlarging the freedom of choice”, “Connect the program to topical, socio-spatial sustainability challenges by updating module content and strengthening digital, intra- and interpersonal

skills”, and “Innovate pedagogies and didactics”. The fourth objective – “Less workload and pressure” – trickled down in particular in a slightly adjusted curriculum structure via the T- and P-weeks and a slight reduction of the number of learning objectives. All module and throughline teams were asked to integrate and respond to all four objectives.

### 3. RESULTS

#### Challenges in the Design throughline

The bachelor’s 60EC Design program is organized and structured in such a way that students systematically develop more in-depth design experiences and skills. Over the years, students encounter various design themes, approaches, methods, and subdisciplines within the field of spatial design. Projects become more complex over time, and students are asked to integrate more diverse and in-depth knowledge each time. All projects are connected to one or more Sustainable Development Goals (Bouwkunde, 2024).

In projects ON1, ON2, and ON3, the assignments are relatively simple to learn the basic skills of architectural, landscape architectural, urban, and building technological design: (ON1) *House and Anchoring in the Landscape* focuses on the living quality of a small residential house, (ON2) *Design and Technology* focuses on sustainable materials and construction for a small public building. In this first-year ON1/ON2 program, all students enroll for the same kind of studio (and thus design) approach.

In the second and third years of the bachelor’s program, the design projects focus on relatively more complex, challenge-based assignments, and students can choose their perspectives, focus areas, design approaches, and/or interests:

**ON3 City and Public Space.** This studio focuses on the structure of urban space and the city’s public and private relations. Students choose a particular focus and starting point for their urban design studio enrollment: a socio-morphological, landscape, ecological, cultural-historical, or computational approach. Different specialised teacher teams support and coach the different theme-based student groups.

**ON4 - Residential Building and Environment.** Upon enrolment, students choose one (out of 5-10) studio with a specific design approach connected to a topical, real-life theme, such as collectivity, affordable housing, renovation, green densification, sustainable (bio-based) materials, or living concepts. Teams of design tutors from both practice and academia lead the different studios.

**IOP1 – Area (Re)Development.** In this project design, teams of 10 students collaborate in role-play and are asked to develop a spatial vision and redevelopment strategy for an urban district with a time horizon of 50 years. Students can choose their roles: Economic Affairs, Sustainability Specialist, Geo-data Specialist, Landscape Architect, Project Leader, Regional Planner, Real Estate Developer, Real Estate User, Urban Designer, Joker (differs per case, per year). Students are supervised by role tutors – one tutor per role – and group tutors – one tutor for two design teams.

**IOP2 – Public Building.** This project focuses on an integral and sustainable architectural design of a public building, in line with the Area (Re)Development of IOP1. Students can choose one of three directions to emphasise in their technical detailing: building technology,

urban & landscape technology, or building & construction management. For this specialisation, students receive specific and additional tutoring besides their main tutor. Part of the assignment is the development of a personal design vision, statement, or position.

### **Holistic learning objectives**

Students become more proficient in design by doing and practicing, analyzing existing designs and design processes, learning from feedback (self, peer, and expert), and becoming aware of what is essential in the design process. The design process is characterised by four strongly related skills (Van Dooren, 2024), which are the foundation of our Design program's (generic) learning objectives: position, knowledge, research, and communication.

#### **Position**

The objective here is learning to develop a position for a specific design situation—also referred to as theme, concept, or vision—and for the student as a designer—also referred to as a value-based design attitude.

This means developing and thinking about one's position or vision as a designer for the design assignment, the socio-spatial challenge, or the theme that characterises the final design proposal. Developing such a position is a dynamic and time-consuming process that involves several iterations. At the same time, constructing such a position helps the designer find the focus for the design and the anchor for the design process. It guides and steers design decision-making.

#### **Knowledge (scholarly design)**

The objective here is learning to develop a knowledge-based or knowledge-informed attitude and working method.

This means applying, combining, contextualizing, and transforming evidence, theory, and/or knowledge in a design proposal. This kind of design knowledge has been developed and tested over the years. Usually, you can find this knowledge in and via existing (reference) projects and in the form of principles, guidelines, or patterns. The designer is not (and cannot be and does not have to be) a specialist in all relevant knowledge domains but understands, embeds, uses, and inserts these in order to come to a coherent spatial proposal.

#### **Research (design scholarship)**

The objective here is learning to develop a research-oriented design attitude.

This consists of two ways of working. First, it is about exploring, experimenting, evaluating, and reflecting, a cyclic-iterative process of developing various ideas, variants, and/or alternatives, comparing, testing, evaluating these, and zooming in and out. The designer continuously examines whether the ideas still fit in the bigger picture (Position) and if they comply with the tried and tested knowledge (Knowledge).

Second, it is about analysing: formulating relevant research questions, researchable design questions, and researching relevant aspects. Relevant questions cannot only be formulated based on the design assignment but also pop-up during experimenting and exploring.

#### **Communication**

The objective here is learning to communicate during and about the design (outcomes and products) and design process.

This relates to clearly explaining and presenting a design proposal in words and images via oral, written, and visual presentation means, both digital and face-to-face. It also relates to collaborating, co-design, co-creation, and discussion skills. Thirdly, it relates to addressing and making explicit and insightful the activities and arguments that resulted in design decisions. And finally, all communication moments, like presentations, deliberations, and exchanges, are meaningful for the design process. They contribute to the process of thought determination and (re)structuring those thoughts and the development of a project as a whole.

Learning to design is a holistic activity. The four learning objectives influence each other directly and indirectly and should not be seen as disconnected skills. These four themes are used for all bachelor design projects to further detail learning objectives in comparable language (Appendix 1). The reasoning behind the learning objectives also resonates in the assessment strategy.

### **Holistic assessment strategy**

The objective of the assessment strategy is to support and structure effective feedback, which—at the same time—should allow room for the unique character of each design proposal, design process, and the expertise of each design tutor (Vliet et al., 2024). We do this not only at the end of a project but particularly during the various design supervision sessions. Just like designing, design assessment is also not an exact science. Design tutors make context-specific assessments based on their specific interests, expertise, knowledge, and experience.

It is our view that it is impossible, even undesirable, to develop a detailed, analytical assessment rubric for design education that in advance lists all aspects that the result needs to have or show. For creative, explorative kinds of work like challenge-based design education, the quality of the whole is not simply the sum of scores of all parts. The assessment of design proposals is about the coherence and interaction between the different parts, and their meaning in relation to the whole. To do justice to this, design needs to be assessed holistically. At an abstract level, we can name aspects that count for all spatial designs, no matter how different they appear in various design outcomes: coherence & meaning, correctness & elaboration, communication, and research. However, they are strongly connected and are hard to assess independently.

To illustrate the approach (Appendix 2 and 3), the IOP1 role-play urban redevelopment project has one rubric for the specialist tutor (role teacher) and one for the design team coach (group tutor). The four rubric aspects are operationalised into a project and perspective-specific (role versus group) description of that aspect and several performance levels. This approach has been applied—the four aspects, project-specific descriptions, and performance levels—to assess all bachelor design modules in a recognizable and comparable language. This aims to have a more consistent, more transparent, and systematic way of assessing design projects that should support students in their journey to becoming better designers.

#### 4. DESIGN THROUGHLINE RENEWAL PROCESS

For our faculty, the bachelor renewal is a significant educational (re)development and innovation project (Hoekstra et al., 2023). We work with a large team of tens of university teachers, student assistants, educational advisors, and educational support and management (ibid.: 46-47). The renewal is led by the bachelor's degree program leaders and the director of education. Besides, there is formal advice and decision moments with the Faculty's Management Team, Board of Studies, Board of Examiners, Department Education Managers, and the Students Council. For advice on sustainability program content and sustainability pedagogies, bachelor leadership is advised by a faculty specialist on sustainability engineering education.

The Design throughline team consists of two throughline leaders, two coordinators per module, one educational advisor, two student members, and one supporting student assistant. During 2022-2024, the team met bi-monthly. Module teams also have so-called quarter meetings with colleagues from other throughlines who teach in the same quarter; throughline leaders meet regularly with other throughline leaders. For the learning objectives and assessment strategy development, the Design team was advised by a senior faculty colleague who specialized in her research on architectural design pedagogies.

Developing the learning objectives and assessment strategy itself can be named a co-creative design process: a cyclic-iterative process of posing and presenting, evaluating and discussing, and deciding and adjusting in several rounds. Despite the sometimes-sharp discussions among colleagues, everybody unanimously agreed on this pedagogical step and renewal. Everybody had the opportunity to collegially co-develop the texts for the rubrics with our advisor, who helped the team be consistent in structure and language. The persistence of our educational leadership – throughline leaders and the bachelor program leader – was also helpful in continuing our discussions till the results were satisfactory for all.

Unfortunately, we did not have such an intense and rich collegial discussion on CBL principles (Cavallo & Quist 2023: p13-17) and the definition and description of sustainability challenges per project (ibid: p12). That would have enriched and strengthened our pedagogies without any doubt. But it would have cost the team another year of preparation, which was unavailable. Individual module teams made detailed choices and decisions on these aspects of CBL and sustainability themselves. An evaluation after one year is envisioned to see what worked out as planned and what did not. This evaluation allows for further discussion on and elaboration of CBL principles and sustainability challenges throughout the online process.

#### 5. CONCLUSIONS

The curriculum team's decisions and discussions regarding the descriptions of the learning objectives and assessment strategy of the Design program (*leerlijn*) within the BSc *Bouwkunde* degree program renewal were all based on our holistic view of design education. The throughline leaders, module coordinators, and design education advisor unanimously agreed on this view. In many educational practices, course and curriculum developments, and University Teaching Qualification programs, there is an (over)emphasis on analytical assessment strategies. For CBL pedagogies such as design education, analytical assessments

usually do not address the essence of developing (design) proposals to intervene in complex systems: you never know in advance which aspect will be most important and most influential. In analytical assessments, the criteria are clearly described, and each criterion's weight is also defined. This clarifies to students in advance how their final grade is built. In general, this sounds fair and transparent. For CBL-type pedagogies, however, it is impossible to imagine how a project will go and what outcomes it will deliver. Every project and every design is different. That makes it impossible to foresee how a criterion will work out specifically and which criterion will be most important. One criterion can be crucially important for one project and less relevant for another. Besides, the total quality of creative work is not simply the sum of all scores of all separate elements. That is why the emphasis on assessment as feedback is so important. It should be helpful in the learning and professionalisation process of students. That is also why, at the curriculum level, there needs to be a shared approach and vocabulary for assessing. Otherwise, students (and tutors!) might end up in unhelpful debates about grading.

Will this work? Is this renewed approach to design education helping us? Does it help all bachelor's students and staff? Does it contribute to avoiding unclarities (and frustrations) in design assessments? These questions will be actively monitored as part of the program renewal evaluation strategy that the faculty has prepared in collaboration with a 4TU Centre for Engineering Education PhD candidate who specialises in education innovation evaluation.

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## 7. APPENDICES

**Appendix 1 – Table 1.** *Learning objectives for the second and third-year bachelor Bouwkunde design projects ON1, ON2, ON3, ON4, IOP1, IOP2 (in Dutch).*

| Project | Position                                                                                                                                                                                                                                   | Knowledge                                                                                                                                                                                                                                                         | Research                                                                                                                                                                                                                                                                                                                                                                                                    | Communication                                                                                                                                                                                                 |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON1     | het ontwikkelen van een betekenisvolle en aan het ontwerp richtinggevende positie ten aanzien van de woonkwaliteit van een woonomgeving en de verankering van huis en tuin in het landschap                                                | het in samenhang toepassen en combineren van kennis in de voor deze opgave relevante aspecten zoals ruimte, compositie en gebruik en schaalniveaus zoals woning, tuin en landschappelijke situatie                                                                | onderzoeken in de vorm van analyseren, met name het begrijpen en beschrijven van de eigenschappen van de locatie en het (woon-/tuin)programma en in de vorm van experimenteren met name de verankering van huis en tuin in het landschap en de ordening van vorm, ruimten en het gebruik en hierop reflecteren                                                                                              | het uitleggen, verbeelden en verantwoorden van een ontwerp en onderzoeksresultaten via bouwkundige handtekeningen, schetsen en maquettes                                                                      |
| ON2     | het ontwikkelen van een betekenisvolle en aan het ontwerp richtinggevende positie ten aanzien van de technische, architectonische en duurzame toepassing van materialen en technieken                                                      | het in samenhang toepassen en combineren van kennis in de voor deze opgave relevante aspecten; materialen, (bouw- en draag)constructie, klimaat, gebruik, ruimte, situatie en duurzaamheid en schaalniveaus; materiële structuur en publiek gebouw                | onderzoeken in de vorm van analyseren, met name het herkennen en begrijpen van de bouwkundige principes in relatie tot de verschillende technische systemen en in de vorm van experimenteren, met name het ontwikkelen van ontwerpvarianten met de focus op technische, functionele en duurzame aspecten en hierop reflecteren                                                                              | het uitleggen, verbeelden en verantwoorden van een ontwerp en onderzoeksresultaten via handmatige schetsen, diagrammen en ruimtelijke modellen en maquettes en bouwkundige (digitale) lijntekeningen          |
| ON3     | het ontwikkelen van een betekenisvolle en aan het ontwerp richtinggevende positie ten aanzien van de ruimtelijke relatie tussen de openbare ruimte, de bebouwing en de structuur van stad en landschap                                     | het in samenhang toepassen en combineren van kennis in de voor deze opgave relevante aspecten; gebruik, ruimte, materiaal, structuur, openbaar-privé overgangen en schaalniveaus; bebouwing en openbare ruimte en stedelijke structuren                           | onderzoeken in de vorm van analyseren, met name het begrijpen van ruimtelijke structuren, relaties tussen de verschillende schaalniveaus, privé en openbaar en veranderingen in de tijd en in de vorm van experimenteren, met name het ontwikkelen, vergelijken en testen van verschillende ideeën en varianten voor de relevante ruimtelijke aspecten op verschillende schaalniveaus en hierop reflecteren | het uitleggen, verbeelden en verantwoorden van een ontwerp en onderzoeksresultaten via schetsen, analysetekeningen, montages, collages, impressies, plankaarten, profielen, (schets)maquettes en (bouw)regels |
| ON4     | het ontwikkelen van een betekenisvolle en aan het ontwerp richtinggevende positie ten aanzien van hoe maatschappelijke ideeën over privaat, publiek en collectief te vertalen zijn in een architectonisch ontwerp                          | het in samenhang toepassen en combineren van kennis in de voor deze opgave relevante aspecten; situatie, gebruik, ruimte, materiaal, maatschappelijke context en schaalniveaus; woning, woongebouw en stedelijk landschap                                         | onderzoeken in de vorm van analyseren en experimenteren, waarbij het met name gaat om een ontwerp te leren ontwikkelen als een vraagstuk met een bepaalde thematiek en hierop reflecteren                                                                                                                                                                                                                   | het uitleggen, verbeelden en verantwoorden van een ontwerp en onderzoeksresultaten via passende middelen en technieken                                                                                        |
| IOP1    | het ontwikkelen van een betekenisvolle en aan het ontwerp richtinggevende positie ten aanzien van een gebiedsvisie en strategie, waarin een duurzame stedelijke herontwikkeling circulair, klimaatadaptief, natuurinclusief centraal staat | het in samenhang toepassen en combineren van kennis in de voor deze opgave relevante aspecten en schaalniveaus: gebruik (programma), functie, ruimte, (milieu)techniek, recht, beslissonderzoek, economie en (maatschappelijke) context                           | onderzoeken in de vorm van analyseren, met name het formuleren en onderzoeken van relevante vragen en aspecten met betrekking tot een gebiedsvisie en strategie voor stedelijke herontwikkeling en in de vorm van experimenteren, met name het disciplinair (eigen rol) en interdisciplinair (ontwerpteam) verkennen en testen van verschillende ideeën en varianten en hierop reflecteren                  | het uitleggen, verbeelden en verantwoorden van een ontwerp en onderzoeksresultaten in overleg, presentaties en rapporten en het reflecteren op het rol- en groepswerk                                         |
| IOP2    | het ontwikkelen van een betekenisvolle en aan het ontwerp (proces) richtinggevende positie ten aanzien van een integraal architectonisch ontwerp (opgave) van een publiek gebouw in een stedelijke context                                 | het in samenhang toepassen en combineren van kennis in de voor deze opgave relevante aspecten en schaalniveaus: architectonische expressie, ruimte en vorm, gebruik en situatie, materiaal en structuur (constructie en klimaattechniek), context en duurzaamheid | onderzoeken in de vorm van analyseren, met name het begrijpen en formuleren van vragen en onderwerpen die binnen de opgave en ingenomen positie relevant zijn en in de vorm van experimenteren, met name de afweging en prioritering van de verschillende aspecten en de architectonische expressie in relatie tot de technische en materiële variabelen en hierop reflecteren                              | het uitleggen, verbeelden en verantwoorden van een ontwerp en onderzoeksresultaten via voor de situatie passende, analoge en digitale middelen, zoals tekeningen en maquettes                                 |

**Appendix 2 – Table 2. Assessment rubric for the third-year IOP1 design project: Group (in Dutch).**

|                                                       | Description                                                                                                                                                                                                                                                                                                                             | Onvoldoende / Insufficient                                                                                                                                                                                                            | Voldoende / Sufficient                                                                                                                                                                                                                                                                                                  | Goed / Good                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Samenhang & Betekenis / Coherence & Meaning           | In het ontwerp is een thematiek herkenbaar, die tot samenhang leidt tussen alle aspecten en schaalniveaus en betekenis geeft aan een duurzame stedelijke herontwikkeling - circulair, klimaatadaptief, natuurinclusief.                                                                                                                 | Heeft niet de juiste, of slecht verantwoorde thema's, onderwerpen en producten ingebracht, waardoor de rol nauwelijks en dus niet voldoende vertegenwoordigd is in het groepsresultaat – producten en proces.                         | Heeft voldoende gedocumenteerde, inhoudelijke thema's, onderwerpen en producten aan het groepsresultaat - producten en proces - geleverd.                                                                                                                                                                               | Heeft goed gedocumenteerde, inhoudelijke thema's, onderwerpen en producten aan het groepsresultaat - producten en proces - geleverd en is daarmee bepalend geweest voor de thematiek en samenhang van het geheel.                                                                                                                                                                                                   |
| Juistheid en Uitwerking / Correctness and Elaboration | De volgende aspecten en schaalniveaus zijn op relevante kennis gebaseerd, en ver genoeg uitgewerkt: gebruik(programma), functie, ruimte, (milieu)techniek, recht, besiskunde, economie en (maatschappelijke) context.                                                                                                                   | Heeft een (te) weinig uitgewerkte inhoudelijke inbreng en een beperkte, defensieve positie in het onderhandelings- ontwerp- en uitwerkingsproces.                                                                                     | Heeft voldoende inhoudelijke inbreng en een constructieve positie in het onderhandelings- ontwerp- en uitwerkingsproces.                                                                                                                                                                                                | Heeft een goed uitgewerkte inhoudelijke inbreng en een constructieve en sturende positie in het onderhandelings- ontwerp- en uitwerkingsproces.                                                                                                                                                                                                                                                                     |
| Onderzoek / Research                                  | Het ontwerp is gebaseerd op onderzoek. Er zijn relevante vragen geformuleerd en onderzocht en relevante aspecten en precedenten geanalyseerd. Er is geëxperimenteerd met opties binnen 'de gegeven context' van de herontwikkelingsopgave en met de roleigen waarden, doelen en middelen als input voor de groepsvisie en -strategie.   | Heeft (te) weinig inbreng vanuit de roleigen bronnen, vragen, precedenten, ontwerpideeën, of varianten. De eigen inbreng wordt slecht beargumenteerd en onvoldoende in relatie gebracht met het (ontwerp)onderzoek van groepsgenoten. | Heeft voldoende inbreng vanuit de eigen bronnen, vragen, precedenten, ontwerpideeën, of varianten. De eigen inbreng wordt beargumenteerd en in relatie gebracht met het (ontwerp) onderzoek van groepsgenoten. Zorgt ervoor dat in het ontwerpproces van het team geëxperimenteerd wordt op de relevante schaalniveaus. | Heeft sterke, agenderende en sturende inbreng vanuit de eigen bronnen, vragen, precedenten, ontwerpideeën, of varianten. De eigen inbreng wordt zorgvuldig beargumenteerd en constructief in relatie gebracht met het (ontwerp)onderzoek van groepsgenoten. Zorgt ervoor dat in het ontwerpproces van het team geëxperimenteerd wordt op de relevante schaalniveaus en alternatieven zorgvuldig geëvalueerd worden. |
| Communicatie / Communication                          | Het ontwerp, de thematiek en het onderzoek zijn op inzichtelijke wijze gedocumenteerd, gevisualiseerd en beargumenteerd, met name in een mondelinge groepspresentatie en groepsposter en vanuit de eigen rol een schriftelijk rolrapport met de verantwoording van het onderzoek en de ontwerp-, inrichtings- en/of investeringskeuzes. | Is passief in voorbereiding, presentatie en discussie. Krijgt negatieve peer-feedback. Geeft weinig relevante en/of impactvolle feedback aan de teamleden.                                                                            | Is actief in voorbereiding, presentatie en discussie. Krijgt positieve peer-feedback. Geeft voldoende relevante en/of impactvolle feedback aan de teamleden.                                                                                                                                                            | Is constructief sturend in voorbereiding, presentatie en discussie. Herkent, benoemt en benut de bijdragen van anderen. Krijgt zeer positieve en breed gedragen peer-feedback. Geeft zeer relevante en/of impactvolle feedback aan de teamleden.                                                                                                                                                                    |

**Appendix 3 – Table 3. Assessment rubric for the third-year IOPI design project: Role (in Dutch).**

|                                                     | Description                                                                                                                                                                                                                                                                                                                             | Onvoldoende / Insufficient                                                                                                                                                                                                         | Voldoende / Sufficient                                                                                                                                                                   | Goed / Good                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Samenhang & Betekenis / Coherence & Meaning         | In het ontwerp is een thematiek herkenbaar, die tot samenhang leidt tussen alle aspecten en schaalniveaus en betekenis geeft aan een duurzame stedelijke herontwikkeling - circulair, klimaatadaptief, natuurinclusief.                                                                                                                 | Heeft een niet juiste, slecht verantwoorde en/of inhoudelijk beperkte thematiek bestudeerd, waardoor de diepgang in de rol niet is bereikt.                                                                                        | Heeft een juiste en voldoende verantwoorde inhoudelijke thematiek bestudeerd, waardoor de diepgang in de rol is bereikt met potentiële waarde voor het groepsontwerp.                    | Heeft een juiste, originele en goed verantwoorde inhoudelijke thematiek bestudeerd, waardoor de diepgang in de rol is bereikt en er inhoudelijke potentie is om van grote waarde te zijn voor het groepsontwerp.                                                                           |
| Juistheid en Uitwerking Correctness and Elaboration | De volgende aspecten en schaalniveaus zijn op relevante kennis gebaseerd, en ver genoeg uitgewerkt: gebruik(programma), functie, ruimte, (milieu)techniek, recht, beslistkunde, economie en (maatschappelijke) context.                                                                                                                 | Heeft een beperkt inzicht ontwikkeld in de eigen rol en positie en heeft dat onzorgvuldig uitgewerkt in rolproducten (kaarten, beelden, beschrijvingen ed).                                                                        | Heeft een voldoende inzicht ontwikkeld in de eigen rol en positie en heeft dat uitgewerkt in passende rolproducten (kaarten, beelden, beschrijvingen ed).                                | Heeft een diep inzicht ontwikkeld in de eigen rol en positie en heeft dat zorgvuldig uitgewerkt in passende rolproducten (kaarten, beelden, beschrijvingen ed).                                                                                                                            |
| Communicatie / Communication                        | Het ontwerp, de thematiek en het onderzoek zijn op inzichtelijke wijze gedocumenteerd, gevisualiseerd en beargumenteerd, met name in een mondelinge groepspresentatie en groepsposter en vanuit de eigen rol een schriftelijk rolrapport met de verantwoording van het onderzoek en de ontwerp-, inrichtings- en/of investeringskeuzes. | Heeft een niet of weinig toegankelijk rolrapport met geringe diepgang, onderbouwing en verantwoording. Is passief in voorbereiding, presentatie en discussie.                                                                      | Heeft een toegankelijk rolrapport met voldoende diepgang, onderbouwing en verantwoording. Is actief in voorbereiding, presentatie en discussie.                                          | Heeft een uitnodigend rolrapport met grote diepgang, onderbouwing en sterke verantwoording. Herkent, benoemt en benut de bijdragen van andere rolcollega's. Is constructief sturend in voorbereiding, presentatie en discussie.                                                            |
| Onderzoek / Research                                | Het ontwerp is gebaseerd op onderzoek. Er zijn relevante vragen geformuleerd en onderzocht en relevante aspecten en precedents geanalyseerd. Er is geëxperimenteerd met opties binnen 'de gegeven context' van de herontwikkelingsopgave en met de roleigen waarden, doelen en middelen als input voor de groepsvisie en -strategie.    | Heeft het rolwerk niet of nauwelijks gebaseerd op (ontwerp)onderzoek. Heeft te weinig relevante vragen geformuleerd. Is academisch onzorgvuldig te werk gegaan (methoden, verantwoording, informatievaardigheden, brongebruik ed). | Heeft het rolwerk gebaseerd op (ontwerp)onderzoek. Heeft relevante vragen geformuleerd. Is academisch te werk gegaan (methoden, verantwoording, informatievaardigheden, brongebruik ed). | Heeft het rolwerk gebaseerd op breed en diep (ontwerp)onderzoek en brengt daarmee originele en waardevolle inzichten naar voren. Heeft meerdere relevante vragen geformuleerd. Is academisch zorgvuldig te werk gegaan (methoden, verantwoording, informatievaardigheden, brongebruik ed). |