GUIDELINE FOR THE DESIGN AND IMPLEMENTATION OF SKILLS LEARNING TRAJECTORIES

WAGENINGEN
UNIVERSITY & RESEARCH

GUIDELINE FOR THE DESIGN AND IMPLEMENTATION OF SKILLS LEARNING TRAJECTORIES

Wageningen University and Research
Adopted by the BSc Skills Steering Group, February 2023

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INTRODUCTION

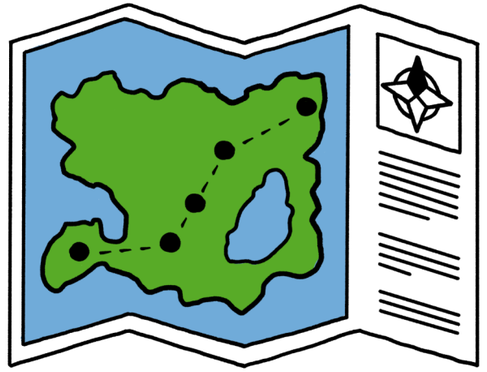
SKILLS EDUCATION

Wageningen University and Research (WUR) has expressed the ambition to make skills learning trajectories visibly present in all bachelor's degree programmes by 2025. In order to achieve this the BSc Skills Learning Trajectories project was installed. The aim of this project is to create and strengthen continuous skills learning trajectories in the curricula of all bachelor's programmes at WUR and make them visibly present.

In higher education there is increasing attention for the development of cognitive (such as critical thinking), interpersonal (like collaboration), and metacognitive skills (self-regulation, for example) (OCW, 2021). Skills are best developed when: (1) addressed multiple times during the study programme and (2) students are stimulated to reflect upon their skills, and relate their current performance to previous performance (Malecka & Boud, 2021; Merrill, 2002). This requires programmes to adjust their curriculum accordingly to optimise students' skills development. Different courses and assessments that address the same skills should strive towards the same pre-determined learning goals, and should build upon each other (Levander & Mikkola, 2009; Wijngaards-de Meij & Merx, 2018).

When the content and learning activities of courses in a curriculum are aligned, and courses build towards a set of coherent learning goals, these courses form a learning trajectory. Carefully designed learning trajectories guarantee that learning activities in individual courses work towards the ultimate goals of a programme in a well-structured and consistent manner. For programme management, as well as for teachers and students, this continuity is an important factor for the organization, design and effectiveness of education.

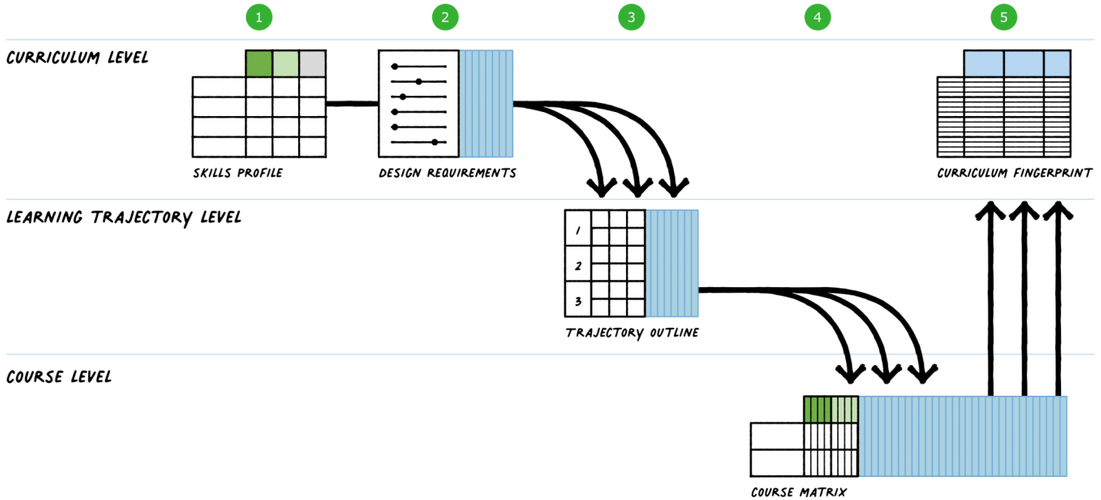
This guideline provides a step by step approach for designing and implementing visible and coherent learning trajectories, that match the vision, characteristics, nature and context of the programme that develops them. Each step ends with an instrument that results in a concrete design step, preceded by a small amount of background information and a conversation tool that helps to complete the instrument.



ROADMAP

The chapters in this guideline correspond to the design steps in the roadmap on the next page. When designing a curriculum or a learning trajectory from scratch it may be wise to start with step 1 and work your way up to step 5. However, depending on your ambition or needs any step can be a starting point. For example, for most programmes at WUR it makes perfect sense to start with step 5, analyse the fingerprint, then jump back to step 3 to reinforce a particular learning trajectory, checking steps 2 and 1 if necessary, advancing to step 4 and ending at 5 again to process the resulting changes.

Every chapter contains a brief explanation of the design step and an instrument that supports the (re)design process. On top of that, steps 1–4 contain a conversation tool that helps to ask the right questions, and steps 1-3 contain a blueprint that provides a structured representation of the learning trajectory. Blank versions of all instruments are available for download as editable documents in the Teams site for the BSc Skills Learning Trajectories project. For every design step support is available in the form of hands-on advice, resources and training (see appendix). Please contact the skills support team if you need any help.



To create or reinforce visible skills learning trajectories it is important to:

1

Determine the significance and level of each skill within the programme
Step 1 provides support in drawing up a programme-specific *skills profile*. Which skills are particularly significant for the programme? Which are core skills, which are supportive skills and which skills are implicitly addressed? How is the skill defined? And what should students visibly achieve per skill at the end of the learning trajectory?

2

Determine the requirements for the implementation of each learning trajectory
Step 2 focuses on providing direction by formulating *design requirements* for skills implementation, appropriate to the nature and context of the programme. Is skills education embedded in existing courses or in a dedicated longitudinal skills course? What is the investment in teaching hours? What materials and criteria should be used? And how will the results of students be visible?

3

Know the position and function of each course in which the skill is addressed
Step 3 helps to make a detailed *trajectory outline* of the learning trajectory with all points in the curriculum where the skill is offered. How do courses build upon each other to reach the established goal? Do they use the same materials? Where is the skill introduced and at what level? Which learning activities take place in which courses? How and in which courses is student performance evaluated and by what criteria?

4

Make sure each course is constructively aligned and coherent with other courses
Step 4 provides some background on (re)designing constructive aligned courses and results in a clear *course matrix* with learning outcomes, learning activities, and assessment tasks. What goals do students achieve? How do the learning activities contribute to this? What are the assessment tasks and how do they tie in with the learning outcomes?

5

Make clear where and how skills are addressed within the programme
Step 5 aims at making visible where skills education is implemented in the curriculum in the form of a *curriculum fingerprint*. This instrument can be used to improve and monitor coherence and to provide internal and external accountability. In addition, a few more ways to increase the visibility of skills in the curriculum are proposed.

1

STEP 1. SKILLS PROFILE

CURRICULUM LEVEL

In order to create a skills profile, it is essential to consider the relationship between the skills and the programme outcomes, and to decide which skills are particularly significant for the programme and the final level students should achieve.

Step 1 of this guideline provides guidance on how to determine the skills profile. It includes three supportive instruments: (1) a conversation tool, with a list of questions that may be helpful when determining the skills profile; (2) an example of a skills profile and (3) an example of a skills trajectory blueprint. The blueprint summarizes the design decisions regarding a certain skill, as a starting point for creating or redesigning a learning trajectory. Blank versions of these instruments are available for download as Word documents in the Teams site for the BSc Skills Learning Trajectories project.

The aim of the Skills Learning Trajectories project is to create or strengthen visible learning trajectories for an established set of sixteen skills. These skills are seen as fundamental for students to develop their personal and professional identity and to flourish in a professional and academic context.

At Wageningen University and Research (WUR) students will acquire, cultivate and hone a combination of these sixteen skills through instruction, practice, receiving feedback and evaluation. Based on its own skills profile, each programme can give substance to the WUR ambition aimed at the visible implementation of skills learning trajectories in every bachelor's degree programme. Not all skills and learning trajectories have to be addressed to the same extent and be of the same size and intensity.

Programmes can give some skills more prominence than others, appropriate to the vision, characteristics, nature and context of their specific programme. Consulting internal and external stakeholders (for instance from the workfield) might result in interesting input for this process. Which skills do they think graduates will need for their future careers?

In order to draw up an appropriate skills profile, it is necessary to:

- examine the role of skills in relation to the **programme outcomes**;
- decide on the **significance** of each skill for achieving those outcomes; and
- agree on the **level** of mastery for each skill.

Programme outcomes (entire skill set)
For the selection of skills, individual choices can be made for each programme, in line with its nature, context and vision, to determine the goal and focus of skills within the programme. To achieve this, it can be relevant to compile a concrete overview of the main focus and most important outcomes of the programme, related to skills.

Most programmes have already recorded this information in documents such as their profile, their final qualifications, the domain specific framework and overviews of recent developments in the workfield. Based on these the goal and relevance of every skill for the programme can be determined. It may be helpful to compile the skills profile in consultation with stakeholders in the professional field

(for instance, a workfield committee and/or alumni).

In addition to the WUR defined skill set, programmes can choose to add programme-specific skills to their skills profile. For example, some programmes choose to pay explicit attention to developing lab skills or design skills.

Significance (per skill)
When determining a skills profile, a distinction can be made between different kinds of skills, depending on their significance for the programme. (Please note the examples given below are just for clarification purposes. An implicitly taught skill in one programme could very well be a core skill in another.)

Core skills. These skills have the most visible focus in a programme. They are closely related to the learning outcomes and nature of the specific programme. It makes sense to explicitly introduce, practice and evaluate these skills at recognisable points in the programme and to make sure the final level that students achieve is demonstrated in a portfolio or a final product. For example, a skill like Research design could be essential for graduates in their future career and will therefore be explicitly taught, trained and assessed.

Supportive skills. These skills are considered supportive for the programme, for example to reinforce other skills, subjects or learning goals in the curriculum. These skills are explicitly addressed in education, but have no prominent role in mapping the progress or demonstrating the final level of students. The evaluation of these skills often takes place in relation to another skill. For example, a skill like Feedback can be supportive to Collaboration.

Implicitly taught skills. These skills shape students' development and point of view, but are only implicitly addressed within the programme. They are not explicitly mentioned, trained and assessed. However, the content of the skill can still be aligned, for example because teachers of different courses use the same description and terminology regarding this skill. This results in a coherent learning trajectory in its most minimal form. For example, a skill like Social embeddedness can be addressed in a recognizable way within several courses, without being supported by specific learning activities.

Level (per skill)
For further tuning of the skills profile, it is important to decide on the final level students need to achieve.

Level. If students need to achieve a predetermined level, this level will be set in the skills profile. In one programme, a higher level of Collaboration or Writing will be attained, while in another programme Data science needs more attention. The document *Skills Learning Outcomes* provides tables with descriptions of three possible attainment levels per skill. These descriptions are used to indicate the attainment level students need to achieve in the programme. The most recent version of the *Skills Learning Outcomes* can be found on the Teams site for the BSc Skills Learning Trajectories project.

CONVERSATION TOOL

Asking these questions can help to determine which skills are most important in the programme and what the level should be for each skill.

DETERMINING THE SKILLS PROFILE

Programme outcomes (total skill set)

- Which documents provide information about the goal and vision of the programme? Which skills are explicitly mentioned in these documents?
- Which skills do students, teachers and alumni think are missing in the programme?
- What are the main goals of the programme regarding skills acquisistion, according to the documents and consulted stakeholders? Are there any programme specific skills that should be included in the skills profile, that are not part of the standard WUR skills set?

Significance (per skill)

- What are the core skills of the programme? Which skills should every graduate demonstrably master? Which skills have to be explicitly instructed, trained and evaluated?
- What are the key supportive skills? Which skills are explicitly addressed within the programme to reinforce other skills, subject content or learning goals in the curriculum?
- What are the supportive skills that shape students' development and point of view, but are only implicitly addressed within the programme? What skills are covered but not explicitly taught or assessed?

Level (per skill)

- What level for each skill best suits the goal and vision of the programme?
- Is assessment needed to determine the perfomance of students?

SKILLS PROFILE (EXAMPLE)

Determine the skills profile by ticking the appropriate boxes and deciding on the final level students achieve.
I = Instruction; L = Learning activities; F = Feedback; A = Assessment.

		Core skills What are the core skills of the programme? What skills should every graduate demonstrably possess? What skills are explicitly instructed, trained and evaluated?				**Supportive skills** What are the main supportive skills? What skills are explicitly addressed within the programme to reinforce other skills, subjects or learning goals in the curriculum?				**Implicitly taught skills** What are the supportive skills that shape students' development and point of view, but are only implicitly addressed within the programme? What skills are covered but not explicitly taught?			
Communication	Level	I	L	F	A	I	L	F	A	I	L	F	A
Academic English	2										✓	✓	
Argumentation	2									✓	✓	✓	
Presenting	3	✓	✓	✓	✓								
Writing	3	✓	✓	✓	✓								
Research													
Research design	2	✓	✓	✓	✓								
Information literacy	1					✓		✓					
Data science	3	✓	✓	✓	✓								
Personal development													
Collaboration	3	✓	✓	✓	✓								
Feedback	2					✓	✓	✓					
Personal leadership	2	✓	✓	✓	✓								
Reflection	2						✓	✓					
Entrepreneurial skills	1						✓						
Responsibility													
Diversity	3					✓	✓						
Ethics	1									✓	✓		
Philosophy of science	1					✓	✓	✓	✓				
Social embeddedness	1										✓		

Core skills

Presenting
Writing
Research design
Data science
Collaboration
Personal leadership

Supportive skills

Information literacy
Entrepreneurial skills
Feedback
Reflection
Diversity
Philosophy of science

Implicitly taught skills

Academic English
Argumentation
Ethics
Social embeddedness

SKILLS TRAJECTORY BLUEPRINT (EXAMPLE)

After the skills profile has been determined the first section of the blueprint can be completed for each skill. This is the first step of (re)developing skills learning trajectories. Step 2 is focused on determining the design requirements.

SKILL: PRESENTING

Level	**Significance**	**Elements**
☐ 1 ☐ 2 ☒ 3	☒ Core skill ☐ Supportive skill ☐ Implicitly taught skill	☒ Instruction ☒ Learning activities ☒ Feedback ☒ Assessment

Definition
Students can independently plan, prepare and practise a well structured presentation in their own style. They show that they master the content well enough to present main and secondary ideas in a clear, enthusiastic and compelling way. Students are able to adapt the message and delivery techniques to their audience, using a variety of supporting materials and visual aids to get the message across.

DESIGN REQUIREMENTS

Placement …	**Materials** …
Timing …	**Criteria** …
Capacity …	**Results** …

LEARNING TRAJECTORY

Course 1 …	**Course 2** …	**Course 3** …	**Course 4** …
Course 5 …	**Course 6** …	**Course 7** …	**Course 8** …
Cross course elements …			

2

STEP 2. DESIGN REQUIREMENTS

CURRICULUM LEVEL

Developing a learning trajectory for one or more skills requires making several choices at curriculum level that determine the way in which skills are reflected in education. The first step is to determine a skills profile in relation to the vision, goals, conditions and context of the programme (Step 1). Step 2 is to consider how to make the implementation of skills learning trajectories in the programme feasible, scalable and sustainable by formulating design requirements.

This chapter provides guidance for determining the design requirements for each skill addressed within the programme. It includes three supportive instruments: (1) a conversation tool that can be helpful for deciding on the design requirements; (2) an example of the design requirements for a skills learning trajectory and (3) an example of a skills trajectory blueprint. The blueprint summarizes the design decisions regarding a certain skill, as a starting point for creating or redesigning a learning trajectory. Blank versions of these instruments are available for download as Word documents in the Teams site for the BSc Skills Learning Trajectories project.

At curriculum level, decisions have to be made about various elements that influence the way a learning trajectory and the courses are constructed:

- **Placement** *(integrated in courses vs. longitudinal course)*
- **Timing** *(fixed vs. flexible)*
- **Capacity** *(low vs. high)*
- **Materials** *(general vs. programme-specific)*
- **Criteria** *(equal vs. ascending)*
- **Results** *(curriculum level vs. course level)*

These elements are interdependent. Mapping out choices and considerations for each element gives the opportunity to think about skills education from different angles. Design requirements can then be determined based on a combination of choices. Ideally, all requirements are linked to each other and to the vision and context of the programme, aiming at consistency and coherence.

A combination of choices results in a scenario: a set of design requirements for developing and implementing a learning trajectory for a particular skill. For different skills different scenarios are conceivable, depending on the choices that have been made. At the one extreme there may be a scenario that is completely programme-driven, with fixed learning activities integrated in existing courses of the programme. At the other extreme could be a longitudinal course in which students work on their skills development, pick their own moments when they ask for feedback and demonstrate their final level in a (digital) portfolio.

Placement *(integrated in courses vs. dedicated courses)*
Skills education can be integrated in existing courses within the programme. When a skill naturally comes up in applied teaching or assessment methods within the programme, this is an obvious choice. For example, a skill like Writing is naturally addressed when students have to write an article, advice or essay as part of a course. A skill, or a combination of skills, can also be addressed in a dedicated skills course. For example, a skill like Personal leadership can be offered within a longitudinal course, to enable students to reflect on meta level on their personal goals, achievements, and progress. A combination is also possible, for example when skills are addressed in the existing courses of the programme and on top of that there is room for students to reflect on their progress and formulate personal learning goals concerning multiple skills in a longitudinal course.

Timing *(fixed vs. flexible)*
Skills can be addressed at fixed moments in the programme. It is then determined at programme level when students work on a specific skill. For example, it can be predetermined by the programme in which courses students will have to give a presentation. If timing is flexible, students can work on a skill if the opportunity arises or when they choose to create such an opportunity. For example, there could be flexibility in when and how Diversity & inclusivity comes up, leaving it up to students to take the opportunity to work and reflect on this skill, handing in their results at a suitable moment. It is also an option to create both fixed and flexible moments to work on a skill. This could for example mean that students work on the skill when the opportunity arises, while there are fixed moments within the curriculum where they reflect on their progress and results.

Capacity *(low vs. high)*
Depending on the type of programme and skill, a programme may decide to make a high or low investment for teaching this skill. Considerations include the number of credits available for skills education, the amount of time teachers and students can spend on teaching and assessing a specific skill, and the budget available for skills education. If there is a lot of space, time and opportunity to work on a skill, the learning activities and way of assessment that are chosen can be more extensive. For example, teachers may be able to spend more time on giving feedback on products, or an expert may be hired to give individual feed forward about students' performance. If there is less time and capacity available, more restrictive choices have to be made about the way a skill is offered and assessed, corresponding perhaps with a lower level of ambition for that particular skill.

Materials *(existing vs. customized)*
For every skill, a programme may consider using existing materials, or to develop programme-specific materials. This concerns materials for the instruction, practice, feedback and assessment of a skill. For a skill such as Academic English it could make sense to take advantage of existing materials when the content of the skill is not programme-related. For other skills, for example Data science, it may for some courses be necessary to develop new materials that are tailored to the context and specific needs of the programme. It is also possible that a programme chooses for the most part to stick to existing materials, with slight adaptations to ensure that these optimally relate to the content and context of the programme.

Criteria *(equal vs. ascending)*
A programme may choose to assess students regarding a specific skill at the same level during the entire curriculum. This can be done, for example, by always using the same rubric that grades students' performance below, at, or above the intended final level, in combination with personalized feedback or feed forward. Another option is to gradually raise the bar for the level and the criteria on which students are assessed. In the first year, for example, lower expectations could be set for the development of a skill, compared to what is expected in the final year. Students then always know if their mastery of a particular skill is satisfactory at that specific moment in their education.

Results *(curriculum level vs. course level)*
The results and progress of students can be tracked at both course level and curriculum level. At course level this means that when a skill is offered, it is clear to students where they stand regarding their development of this skill. The next time a skill is offered they can then build on this. It is also possible to collect and/or track the results at cross-curricular level, for example in a portfolio or by awarding edubadges. This may require extra effort from both teachers and students, but it provides a lot of insight and control over the results and progress.

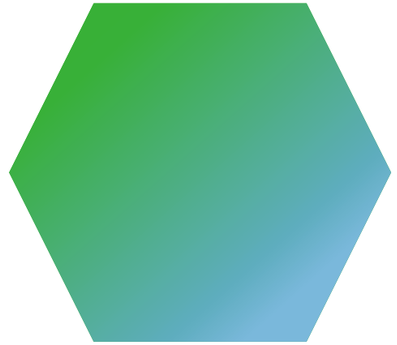
CONVERSATION TOOL

Discussing multiple scenarios can help to determine for each skills learning trajectory what the requirements for development will be. In the requirements of your programme (see example on the next page), you can place a dot on the scale where it feels about right and then write a short explanation. The dot can be either on one of the extremes, or somewhere in between. You can do this as a team, or do it individually first and then compare results.

Results
- ☐ Results and progress of students are tracked on course level.
- ☐ Results and progress of students are tracked on programme level.
- ☐ Results and progress are tracked on course and programme level.

Placement
- ☐ The skill is integrated in existing courses.
- ☐ The skill is addressed in a dedicated longitudinal course.
- ☐ The skill is integrated in existing courses and in a dedicated longitudunal course.

Criteria
- ☐ The criteria used are equal during the entire programme.
- ☐ The criteria used are ascending during the programme.
- ☐ The criteria are mostly equal/ascending but there are exceptions.



Timing
- ☐ The skill is addressed at fixed moments in the programme.
- ☐ The timing is flexible. Students choose when they work on the skill.
- ☐ There are both fixed and flexible moments to work on the skill.

Materials
- ☐ Existing materials are used in every course.
- ☐ The programme and/or courses each use their own customized materials.
- ☐ A combination of existing and customized materials will be used.

Capacity
- ☐ There is time and capacity to thoroughly teach the skill.
- ☐ There is a minimum amount of time and capacity to teach the skill.
- ☐ At certain moments there is extra time and capacity to teach the skill.

DESIGN REQUIREMENTS (EXAMPLE)

Determine for each skills learning trajectory what the curriculum elements look like by placing a dot on the scale (either on one of the extremes, or somewhere in between) and writing a short explanation.

SKILL: PRESENTING	
Placement	Integrated in courses — Dedicated course Instruction, learning activities, feedback and assessment regarding Presenting occur within regular courses in the curriculum.
Timing	Fixed — Flexible There are fixed moments in the programme where students have the opportunity to work on Presenting. Since giving a presentation will mostly be part of a group assignment, students decide for themselves when they take the opportunity to present.
Capacity	Low — High Investment on this skill is low, because it is relatively easy for students to work on this skill. The programme will invite the expertise of a WUR specialist at three moments within the programme. This specialist will instruct students, give them feedback/feed forward and assess their presentations.
Materials	Existing — Customized The programme uses existing materials: a general hand-out explaining the definition, goals and criteria of the Presenting skill, instructional videos, an interactive training module and a single point rubric.
Criteria	Equal — Ascending During the entire programme, students are assessed based on the same level and criteria. Right from the first time they receive feedback, so they know to what extent they meet the intended final level. Students are scored on a single point rubric with categories: under, at or above the intended final level.
Results	Curriculum level — Course level Student progress and results are not tracked at curriculum level. Students show their results at course level. At the end of the programme, they must have two positive assessment results for Presenting. They do not have to provide evidence in the form of a video or other products.

SKILLS TRAJECTORY BLUEPRINT (EXAMPLE)

After the design requirements have been determined the second section of the blueprint for each skills trajectory can be completed. See the example below. Next up is Step 3, where we focus on outlining the learning trajectory.

SKILL: PRESENTING		
Level ☐ 1 ☐ 2 ☒ 3	**Significance** ☒ Core skill ☐ Supportive skill ☐ Implicitly taught skill	**Elements** ☒ Instruction ☒ Learning activities ☒ Feedback ☒ Assessment
Definition Students can independently plan, prepare and practise a well structured presentation in their own style. They show that they master the content well enough to present main and secondary ideas in a clear, enthusiastic and compelling way. Students are able to adapt the message and delivery techniques to their audience, using a variety of supporting materials and visual aids to get the message across.		

DESIGN REQUIREMENTS	
Placement Integrated in regular courses in the programme.	**Materials** General WUR materials on presenting are used (hand-out with definition, goals and criteria; instructional videos; interactive training module; rubric)
Timing There are fixed moments in the programme where students can practice presenting. Students decide when they take the opportunity to present.	**Criteria** Students are instructed and assessed on intended final level
Capacity At three moments in the programme a WUR specialist will instruct students, give feedback/feed forward and assess presentations.	**Results** Students show their results only at course level. At the end of the programme they must have gathered two positive assessment results.

LEARNING TRAJECTORY			
Course 1 …	Course 2 …	Course 3 …	Course 4 …
Course 5 …	Course 6 …	Course 7 …	Course 8 …
Cross course elements …			

3

STEP 3. TRAJECTORY OUTLINE

LEARNING TRAJECTORY LEVEL

When it is clear what the significance of a skill is for a programme (Step 1) and what the requirements are for the design of the learning trajectory (Step 2), the learning trajectory can be developed. To (re)design a learning trajectory it is helpful to first create an outline that shows at what points in the curriculum a skill or a combination of skills is addressed and that makes explicit how the goals and content of the skill(s) will be addressed in each course (instruction, learning activities, feedback and/or assessment).

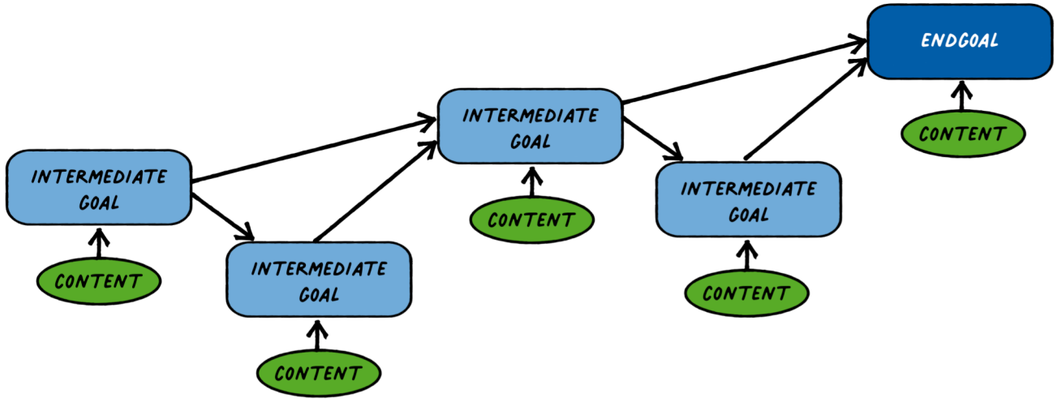
This chapter provides guidance for drawing up a trajectory outline. It includes three supportive instruments: (1) a conversation tool that can be helpful to determine what is needed with regard to instruction, learning activities, feedback and assessment; (2) an example of a trajectory outline; and (3) an example of a fully completed skills trajectory blueprint. The blueprint summarizes the design decisions regarding a certain skill, as a starting point for course (re)design. Blank versions of these instruments are available for download as Word documents in the Teams site for the BSc Skills Learning Trajectories project.

In this step it is determined where and how a skill should be addressed in several courses, in a way that the combination of courses forms a coherent and well-aligned build-up of intermediate goals and content towards the pre-determined end goal (Levander & Mikkola, 2009; Strijker, 2010). To create a continuous learning trajectory, it is important to: (1) decide and map in which courses a skill is addressed; (2) elaborate how that skill is taught in every course (instruction, learning activities, feedback and/or assessment); and (3) describe how the contents of every course in the learning trajectory relate to each other and build up to the end goal. This results in an overview of the learning trajectory that shows where and how a skill is addressed, and in a summary of goals and content for each course, making explicit how the skill will be taught. This will then be the starting point for implementing the skill in the various courses (which will be addressed in Step 4).

In order to develop a skills learning trajectory, a series of courses that address this skill must be identified. The skills profile (Step 1) specifies for each skill whether attention should be paid to instruction (I), learning activities (L), feedback (F) and assessment (A) in this series of courses. The design requirements (Step 2) provide more detailed information about what the teaching and assessment of the skill will look like. By completing a trajectory outline (see last page of this step) it can be determined how often and in which courses instruction and learning activities will take place, and how often and when students will be assessed.

Developers of new curricula can go straight to Step 4 of this guideline to further elaborate the content of the skills education in the courses. But most of the time you are dealing with pre-existing curricula and pre-existing courses in which attention is paid to a skill. In that case the selection of courses that contribute to a skills learning trajectory might already be recorded in the fingerprint (see Step 5). The trajectory outline can then be completed in more detail: which learning activities take place? How are students assessed? A completed trajectory outline then shows how the courses in a learning trajectory connect and build upon each other and to what extent there is variation in the learning activities and assessment tasks offered.

From this overview, it can be analyzed where opportunities lie to introduce the skill and strengthen the learning trajectory, in order to optimize the attention for



this skill in line with the skills profile and design requirements that were previously determined. The trajectory outline also contributes to permanent coordination of skills education and can be used to demonstrate to students, teachers and external parties such as assessment panels or audit committees how skills education is incorporated into the programme.

To complete the trajectory outline it is helpful to consider some basic aspects of how **instruction**, **learning activities**, **feedback and assessment** will contribute to the defined final level of the skill.

Instruction

When students receive instruction about a skill, they learn what the skill entails. The final goal and any intermediate goals are described, including the criteria on which students are evaluated. If the goals and criteria have been clearly defined, students will know what development is expected of them and what level they have to meet in the end. Part of introducing the skill could also be to clarify the significance of the skill in the context of the programme.

Timing. It is important that instruction is given at appropriate moments in the learning trajectory. The point at which a skill is introduced lays the foundation for practising this skill in subsequent education. When a skill is addressed repeatedly, it is helpful to activate prior knowledge from a previous course, but unnecessary overlap should be avoided.

Structure. The instruction students receive at different points in the curriculum should match the level of development expected of them at that point in the programme. For example, the first time a skill is introduced, instruction might be more extensive than in subsequent education. Later in the curriculum instruction can consist of a recap to activate prior knowledge or an extension (in-depth instruction) to raise the level.

Materials. Because students will work on a skill at several points in the programme, it can be useful to structure the instruction in a sustainable way. For example, by recording the instruction in knowledge clips and by developing materials that students can use throughout their education and that can be used again in later courses. Teachers who teach courses later in the learning trajectory can refer back to these materials and build on it.

Learning activities

Students develop their skills best if they can work on them at several points during their education. Ideally this means they will go through a series of aligned learning activities that enable them to practise and develop their performance to the desired final level. Practising regularly will help students to gradually improve and build upon previous experiences.

Timing. How often students work on a skill can vary per skill and per programme. If the frequency of repetition is too low, the visibility of a skill fades, making it difficult to speak of a learning trajectory at curriculum level. A good minimum for repetition of any skill could be two or three times a year. Merrill (2002) indicates that it is important to spread these moments well and to let them build upon each other.

Structure. Depending on whether students work towards a subgoal or end goal, the relevant criteria must be translated into appropriate learning activities. It is helpful for their development when students are encouraged to relate new knowledge about a skill to knowledge they have acquired previously and to explicitly link the moments when they practise a skill.

Materials. To enhance visibility, the moments when students repeat a skill can be highlighted by explicitly naming the skill in assignments and learning activities. Ideally, in different courses in the programme the same

terminology is used regarding a particular skill. In addition, basic materials for the skill, like knowledge clips, literature, guidelines and self-study material are made available in a place that is easy to find.

Feedback and Assessment
Formative evaluation, or feedback and feed forward, is about giving students insight into the progress they are making in their development. Summative evaluation, or assessment, is about recording this progress and determining whether students have mastered their skills at the desired level. This assessment is often recorded in a grade, but a qualification such as 'satisfactory' or 'unsatisfactory' is also considered a summative assessment.

Timing. To monitor and stimulate their development of skills, students must receive regular (formative and/or summative) feedback. A good minimum for the number of evaluation moments could be at least 2-3 times a year. The effect of feedback is enhanced if students can do something useful with it shortly afterwards, for example in a follow-up assignment or in a test. By creating multiple feedback moments in a course and a learning trajectory, students can consciously work on improving a skill.

Structure. The way students are evaluated can shift during a learning trajectory. At the beginning, feedback from teachers is important to keep the understanding of the criteria clear. Later in the learning trajectory, as students have further developed their mastery of the skills, they will be increasingly able to provide themselves and fellow students with useful feedback. If clear assessment criteria have been laid down, for example in a rubric, students can use those criteria to assess their own and each other's work (and learn from doing so).

Materials. To ensure that all courses in a learning trajectory work towards the same end goal and use the same criteria, a rubric could be used. A rubric records the goals and criteria that students must meet in a way that is suitable for providing feedback and/or assigning a grade. The form and content of the assessment should correspond to the goal and criteria in the rubric as closely as possible.

CONVERSATION TOOL

Asking these questions can help to determine for each course in the learning trajectory what is needed with regard to instruction, learning activities, feedback and assessment.

STEP 1. DETERMINING THE LEARNING TRAJECTORY
In which courses is the skill addressed? Is there a clear starting point at an appropriate moment? Are there enough moments for repetition and are these moments well distributed throughout the curriculum? Can students achieve the final level? Is there a clear structure in the build-up of content and level? Is the content coherent and constructive? Are the instruction, learning activities and evaluation sufficiently related and aligned to each other?

STEP 2. ELABORATING GOALS AND CONTENT		
INSTRUCTION In which courses do students receive instruction about the skill? Is there enough/too little/too much instruction? Is instruction given at appropriate moments? Is there agreement on the level, (sub)goals and criteria the instruction is aimed at in different stages of the programme? Is the way students are instructed in different courses coherent? Is it repeated on the same level in another course (recap) or more in depth? Is prior knowledge activated (and unnecessary overlap avoided)? Does the instruction in the first course of the learning trajectory provide students with enough information? Is it a proper foundation for practicing the skill in subsequent education? Is there agreement on which (shared) materials concerning the instruction of the skill will be used and referred to by teachers and students?	**LEARNING ACTIVITIES** Which courses have learning activities for practicing the skill? How much can students practice the skill? Are the learning activities at appropriate moments? Is there agreement on the level, (sub)goals and criteria that must be translated into learning activities? How do the learning activities build on each other? How do students relate new knowledge and experiences to what they have acquired previously? Are the learning activities properly aligned? Which learning activities explicitly relate to other? How will students notice? Is the same terminology used? Will the skill be named explicitly in assignments and learning activities? How will students be aware that they are working on this skill? Will there be shared materials, such as knowledge clips, literature, guidelines and self-study material that will be used again or referred to in subsequent courses? In which courses will these be used?	**FEEDBACK and ASSESSMENT** In which courses is student performance evaluated? When is evaluation formative and/or summative? Do students receive sufficient feedback on their performance? Is feedback given at appropriate moments? Is there agreement on the level, (sub)goals and criteria on which a students is evaluated, for example by using a rubric? Are the form and content of the evaluation moments aligned with the criteria as closely as possible? Are feedback moments related? Is the effect of feedback enhanced by making sure students can do something with it shortly afterwards, for example in a next assignment or during a test moment? Does the way students are evaluated evolve during the learning trajectory? Do students collect their results in a central system such as a portfolio? How are their progress and results visible?

TRAJECTORY OUTLINE (EXAMPLE)

In the trajectory outline you plot the instruction, learning activities, feedback and assessment for each course in the learning trajectory, creating an overview of where and how a skill is addressed in the curriculum.

	Year 1			
Course code	ABC12346	ABC12359	...	...
Period	1	6		
Instruction	Basic instruction Knowledge clip			
Learning Activity	Essay Writing guideline	Essay Writing guideline		
Feedback	2x by teacher Rubric level 1			
Assessment				

	Year 2			
Course code	ABC12365	ABC12366	...	...
Period	4	5		
Instruction	Recap basic instruction Knowledge clip Self-study module	In depth instruction Lecture Self-study module		
Learning Activity	Essay Writing guideline	Essay Writing guideline		
Feedback	1x by teacher 1x by peer Rubric level 1	2x by teacher Rubric level 2		
Assessment		1x by teacher Rubric level 2		

	Year 3			
Course code	ABC12371	ABC12372	...	...
Period	1	6		
Instruction				
Learning Activity	Research proposal Writing guideline Self-study module	Thesis Writing guideline Self-study module		
Feedback	3x by teacher Rubric level 2	3x by teacher Rubric level 2		
Assessment	1x by 2 teachers Rubric level 2	1x by 2 teachers Rubric level 2		

Shared materials	Shared Brightspace course with rubrics, writing guideline, knowledge clips, self-study modules and product upload (portfolio).

SKILLS TRAJECTORY BLUEPRINT (EXAMPLE)

After outlining the learning trajectory the third section of the blueprint can be completed. See the example below. Next up is Step 4, where we focus on developing a single course, based on what is laid out in the blueprint.

SKILL: PRESENTING

Level	**Significance**	**Elements**
☐ 1 ☐ 2 ☒ 3	☒ Core skill ☐ Supportive skill ☐ Implicitly taught skill	☒ Instruction ☒ Learning activities ☒ Feedback ☒ Assessment

Definition
Students can independently plan, prepare and practise a well structured presentation in their own style. They show that they master the content well enough to present main and secondary ideas in a clear, enthusiastic and compelling way. Students are able to adapt the message and delivery techniques to their audience, using a variety of supporting materials and visual aids to get the message across.

DESIGN REQUIREMENTS

Placement Integrated in regular courses in the programme.	**Materials** General WUR materials on presenting are used (hand-out with definition, goals and criteria; instructional videos; interactive training module; rubric)
Timing There are fixed moments in the programme where students can practice presenting. Students decide when they take the opportunity to present.	**Criteria** Students are instructed and assessed on intended final level
Capacity At three moments in the programme a WUR specialist will instruct students, give feedback/feed forward and assess presentations.	**Results** Students show their results only at course level. At the end of the programme they must have gathered two positive assessment results.

LEARNING TRAJECTORY

Course 1 (XYZ12358) Year 1, period 2 WUR expert gives students instruction at level 3. Students give mini presentations about literature. Students give each other peer feedback and receive feed forward from WUR expert.	**Course 2 (XYZ12371)** Year 1, period 4 Students get a recap of the instruction at level 3. Students work through interactive training module 1. Students give mini presentations about practical work. Students give each other peer feedback and receive feedback from teacher.	**Course 3 (XYZ12375)** Year 2, period 1 Students work through interactive training module 2. Students give mini presentations about practical work. WUR expert present for feedback.	**Course 4 (XYZ12378)** Year 2, period 3 Students work through interactive training module 3. Students give mini presentations about practical work. WUR expert present for feedback.
Course 5 (XYZ12384) Year 3, period 1 Students give presentations about practical work.	**Course 6 (XYZ12386)** Year 3, period 6 Students give presentations about bachelor thesis.	...	...

Cross course elements
Module about Presenting in longitudinal Skills Course (Brightspace), containing: hand-out with definition, goals and criteria; instructional videos; 3 interactive training modules; single point rubric.

4

STEP 4. COURSE MATRIX

COURSE LEVEL

In order to develop skills education on course level within a coherent learning trajectory, it is important to be aware of: the goal and significance of that particular skill for the programme (Step 1); the terms and conditions under which the skill can be implemented in the designated courses (Step 2); and the position of these courses within the learning trajectory (Step 3). The completed blueprint of Step 3 provides an overview of the design requirements, of how students are instructed, what learning activities will take place, and how and for what purpose students are assessed in every course in the learning trajectory.

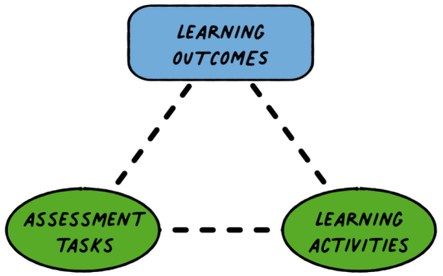
This chapter provides guidance for (re)developing a course as part of a learning trajectory, in a way that the course in itself is constructively aligned, but also connects with the other courses that are part of the learning trajectory in a logical and consistent way. It includes two supportive instruments: (1) a conversation tool with questions and checks to design for contructive alignment; and (2) an example of a course matrix that connects learning outcomes, learning activities and assessment tasks. A blank version of this instrument is available for download as a Word document in the Teams site for the BSc Skills Learning Trajectories project.

To develop skills education within a course, it is helpful to use the principles of constructive alignment. Constructive alignment is a design for teaching in which that which students are intended to learn and how they should express their learning is clearly stated before teaching takes place (Biggs, 2014). To achieve this, clear and purposeful connections must be made between learning outcomes, learning activities and assessment tasks.

Learning outcomes *(or learning goals)*
The first step in designing for constructive alignment is to clearly state what the intended learning outcomes will be for the students. After finishing the course, what are they supposed to be able to do or demonstrate and to which standard?

Formulating how skills are integrated in a course provides clarity for both the teacher and the students and forms the basis for the development of learning activities and assessment. Several options are possible:

- Skills are explicitly addressed in the course and part of the course learning outcomes. An explicit learning outcome must always be assessed, providing proof that students have mastered the learning outcome as described and can complete the course successfully.
- Skills are explicitly addressed in the course, but not assessed. The way in which skills are addressed is then not part of the learning outcomes of the course, but formulated separately as additional skills learning goals;
- Skills are implicitly addressed in the course, and are not assessed. They are neither mentioned in the learning outcomes, nor as skills learning goals.



It is important that the formulated learning outcomes and/or additional learning goals concerning skills education are in line with the objective, the criteria and the level established for that skill in a particular course. It can be helpful for both lecturers and students to use SMART formulated goals. SMART is an acronym for Specific, Measurable, Achievable, Realistic and Time-bound. Outcomes formulated with this method will be clear and concrete. This makes it easier to develop learning activities and assessment tasks that are clearly aligned with the learning outcomes.

Learning Activities

Learning activities help students to achieve the intended learning outcomes, for instance by working through a self-study module, doing practical work or analysing a case study. By undertaking these learning activities students will step by step achieve the learning outcomes of the course. Together, the learning outcomes of all courses in a learning trajectory build towards the intended final level students need to achieve for a particular skill in the programme.

Learning activities for skills can be a part of already existing activities, such as conducting a research project or writing an essay. In addition, it is possible to create independent learning activities that are specifically aimed at training a skill. Skills education can be taught in many forms. Depending on the nature of the skill, different learning activities could be suitable. In the process of choosing, several points of attention can be taken into account:

Connection with learning outcomes. The selected learning activities must enable students to practice and meet the learning outcomes as formulated. If, for instance, collaboration or learning about cooperating in a multidisciplinary team is included in the course learning outcomes, the learning activities may include group work and peer instruction.

Connection with assessment tasks. When students are assessed on their skills performance, learning activities should prepare them for this assessment. Ideally, students are given the opportunity to practise and receive feedback before they are tested.

Level of the students. The learning activities should match the prior knowledge and level of the students. Therefore, it is crucial to consider the place within the learning trajectory of the course you are developing. What have students learned and practised before? Can the learning activities build upon acquired knowledge or previous experiences?

Feasibility. The selected learning activities should be realistic, taking into account the capacity of teachers and the amount of time students and teachers are able to dedicate to instruction, practice, feedback and assessment in the course.

Assessment tasks

The triangle of constructive alignment is closed by assessment tasks that are designed to evaluate to what extent students have achieved the intended learning outcomes. Aligned assessment tasks are created by connecting to the actions that are mentioned in the learning outcomes and building upon the learning activities that students have performed during the course.

As with learning activities, assessment tasks for skills can be part of more general assignments, such as giving a presentation or writing a policy document. Assessment tasks can also be created specifically for assessing skills, such as a reflection or a portfolio assignment. The guiding instrument of this chapter contains various examples to inspire the development of assessment tasks for skills education.

Assessment tasks can have a formative or a summative function. Formative assessment provides students with feedback on their progress and information about how to reach the final level. It can also provide teachers with useful information on how to steer the learning process during the rest of the course. Summative assessment is about making a formal decision about whether students have successfully completed the course, in the form of a grade or a judgement (pass/no pass). In the process of choosing assessment tasks, several points of attention can be taken into account:

Connection with learning outcomes. The selected assessment tasks should provide information about the level of students: do they meet the learning outcomes as formulated? If for instance collaboration or learning about cooperation in a multidisciplinary team is included in the course learning outcomes, the assessment tasks must provide insight about the performance of students related to these topics.

Connection with learning activities. When students are assessed on their skills performance, the assessment tasks ideally repeat or build upon learning activities that they performed earlier in the course (or in previous courses), so students can benefit from the feedback they received and are able to improve their performance.

Level of the students. When students are assessed on their skills performance, it should be clear what criteria will be used to evaluate their level and/or give feedback on their progress. If assessment is summative the criteria should match the desired level of students at that point in the programme. If assessment is formative the criteria can also be on the final level. Ideally the criteria in a course match or build upon criteria in previous courses. Therefore, it is crucial to consider the place within the learning trajectory of the course you are developing.

Feasibility. The selected assessment tasks should be realistic, taking into account the capacity of teachers and the amount of time students and teachers are able to dedicate to instruction, practice, feedback and assessment in the course.

Assessment tool. An assessment tool like a self-assessment format or a (single point) rubric provides clarity about the criteria that are used to give students feedback and feed forward, or to evaluate their performance. A rubric records the goals and criteria that students should meet in a way that is suitable to provide feedback and/or to assign a grade, with the added benefit that it also allows students to evaluate their own and each other's performance. The form and content of the assessment should correspond to the goal and criteria in the rubric as closely as possible.

Collecting evidence. To demonstrate that students have mastered their skills at the desired final level at the end of their education, it can be helpful to collect evidence of this in for instance a portfolio or a dedicated skills course in Brightspace. Chapter 5 contains examples of how the digital learning environment can be used for this purpose.

Support

(Re)designing a course can seem like a big undertaking (and sometimes it can be), but small steps can go a long way and you don't have to do it all on your own. Depending on your needs or what you are aiming for, a range of support options is available at Wageningen University and Research: advice and support for educational design, teacher training, skills expertise, and a large array of tools and resources. The table in the appendix provides a comprehensive - but inevitably incomplete - overview of the support environment for skills education. More information about services and programmes regarding education support in general is available on the website of the Education Support Centre (ESC) The chair group Education and Learning Sciences (ELS) provides education for most skills.

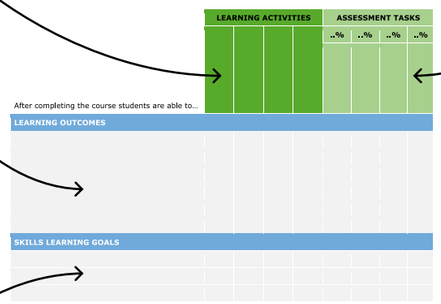
CONVERSATION TOOL

These questions and checklists can help to build up the course matrix.

What are the learning activities of the course? In which learning activities skills are explicitly or implicitly addressed? When students receive an instruction related to a specific skill this can be marked with an asterisk.

What are the learning outcomes of the course? After finishing the course, what are students supposed to demonstrate? If the learning outcomes are related to skills education it might be helpful to explicate the specific skill in parentheses.

Which skills are addressed in the course, but are not part of the learning outcomes? For example: students do practice this skill and do receive feedback, but their level is not summatively assessed at the end of the course.



What are the assessment tasks of the course? How are skills evaluated? Is the skill assessed? And is the assesment formative (F) and/or summative (S)?

This is optional for the skills learning goals, but explicit learning outcomes should always be assessed, providing proof that students have mastered the learning outcome as described and can complete the course successfully.

CHECKLIST LEARNING OUTCOMES

- ☐ Are the learning outcomes a good reflection of what students should be able to do or demonstrate?
- ☐ Are the learning outcomes/goals SMART?
- ☐ Is the role of skills in the course clearly formulated?
- ☐ Is it clear whether learning outcomes related to skills are to be assessed?

CHECKLIST LEARNING ACTIVITIES

- ☐ Are the learning activities related to the learning outcomes?
- ☐ Are the learning activities related to the assessment tasks?
- ☐ Are the learning activities related to the intended level?
- ☐ Are the learning activities realistic in time?
- ☐ Are the skills properly introduced? Do students know what the skills entail?
- ☐ Is prior knowledge activated?
- ☐ Are students able to practice and develop their skill performance?
- ☐ Are students able to reach the intended final level?
- ☐ Are materials from other courses suitable for reuse?

CHECKLIST ASSESSMENT TASKS

- ☐ Are the assessment tasks related to the learning outcomes?
- ☐ Are the assessment tasks related to the target level?
- ☐ Are the assessment tasks related to criteria students need to meet?
- ☐ Are the assessment tasks realistic in time?
- ☐ Are the criteria for student evaluation clear?
- ☐ Do students know what level they have to meet?
- ☐ Do the assessment tasks match the (expected) level of the students?
- ☐ Do students receive feedback on their performance?
- ☐ Is feedback related to the learning outcomes and criteria?
- ☐ Are students able to do something useful with the feedback shortly afterwards?
- ☐ Do the assessment tasks provide insight into progress and/or development?

COURSE MATRIX (EXAMPLE)

The learning goals, learning activities and assessment tasks of a course can be linked in a course matrix, to ensure constructive alignment. See the example below.

- Skills learning goals are not assessed in the course, but are part of the programme outcomes. They may be part of a longitudinal skills course, and it is therefore important that students practice these skills and get feedback on their performance and/or progress.
- In the learning activities columns X* means the learning activity contains instruction about the skill
- F = Formative assessment; S = Summative assessment

	LEARNING ACTIVITIES				ASSESSMENT TASKS			
					20%	20%	60%	0%
After completing the course students are able to...	Tutorials	E-modules	Written assignment	Presentation	Group assignment	Advisory report	Exam	Presentation
LEARNING OUTCOMES								
Calculate greenhouse gas emissions from different sources such as a household, a dairy farm, the transport sector in a country.	**X**						**S**	
Analyse the relationship between climate change and processes of groundwater depletion, deforestation, and species extinction.		**X**		**X**	**F,S**		**S**	**F**
Weigh and interpret the information in publications about climate change **(information literacy)**	**X**	**X**			**F,S**	**F,S**		
Distinguish natural processes related to climate change from human influences **(social embeddedness)**							**S**	
Recall which policies have been proved to effectively influence households and industries to combat climate change							**S**	
Write a well-argued advice to governmental organisations **(writing)**	**X**		**X**			**F,S**		
SKILLS LEARNING GOALS								
Give a structured presentation for a specific target group **(presenting)**			**X***					**F**
Select the most appropriate sources **(information literacy)**	**X**	**X**	**X**					
Reflect on own contribution to group discussion **(reflection)**	**X***							

5

STEP 5. VISIBILITY

CURRICULUM LEVEL

In order to present visible skills learning trajectories at programme level, it is important to have a clear picture of how the learning trajectories are structured (Step 3) and how the learning objectives, learning activities and assessment tasks work towards the desired final level for students within the courses in each learning trajectory (Step 4).

In this chapter, the focus returns to the programme level. Attention to skills education can be monitored by collating the information from the previous steps in a visual overview: the curriculum fingerprint. This is the final supportive instrument of this guideline. A blank version of this instrument is available for download as an Excel document in the Teams site for the BSc Skills Learning Trajectories project.

To monitor the attention to skills education at programme level, the information from the blueprints can be collated in a curriculum fingerprint (see page 37). This instrument is a structured visual representation of all points in the curriculum where skills are part of education.

Making the skills learning trajectories visible at programme level has several functions:

To provide information

- To make students aware that skills development is an inherent part of the courses they take during their bachelor's degree.
- To make it clear to students in which courses they can work on their skills and ask for feedback.

To provide coherence

- To make teachers aware of the responsibility they have in teaching particular skills in their course and to ensure that they can coordinate this properly.
- To support careful design of skills learning trajectories and monitor the build-up and variation in learning activities and assessment tasks.

To provide accountability

- To provide insight into the skills learning trajectories to stakeholders, such as the Board of Education or an audit panel.
- To present evidence that students have reached the desired skills levels.

Additional ways to draw attention to skills education

In addition to the skills profile (see Step 1) and the fingerprint that are drawn up and maintained by each programme, the visibility of skills learning trajectories in the curriculum can be increased in several other ways, depending on the purpose and the wishes of a particular programme. There are, for example, opportunities for doing so in the course catalogue, in the course guides, in the digital learning environment, in a curriculum manual, in a longitudinal course, or in a portfolio.

Course catalogue (Osiris). The course description in the Osiris course catalogue provides students with information about the contents, learning outcomes, activities, examination and literature for a course. Part of this description could be used to mention the skills students will work on during the course.

Course guide. The same information that is in the course catalogue is found with more elaboration in the course guide of a course. A special paragraph in the course guide

could be dedicated to mentioning which skills students will be working on during the course. The occasions at which students work on a skill can be highlighted by explicitly naming the skill in the description of assignments and learning activities. Using the same terminology regarding particular skills in all course guides increases recognizability.

Digital learning environment (Brightspace). All of the above also applies to the course information in Brightspace. On top of that it could be an opportunity to dedicate a special course environment to skills education (even when there is no longitudinal course for skills education in the programme). This skills course environment could function as a platform to collect all basic information and materials for the skills, such as knowledge clips, literature, guidelines, rubrics and materials for self-study and self-assessment.

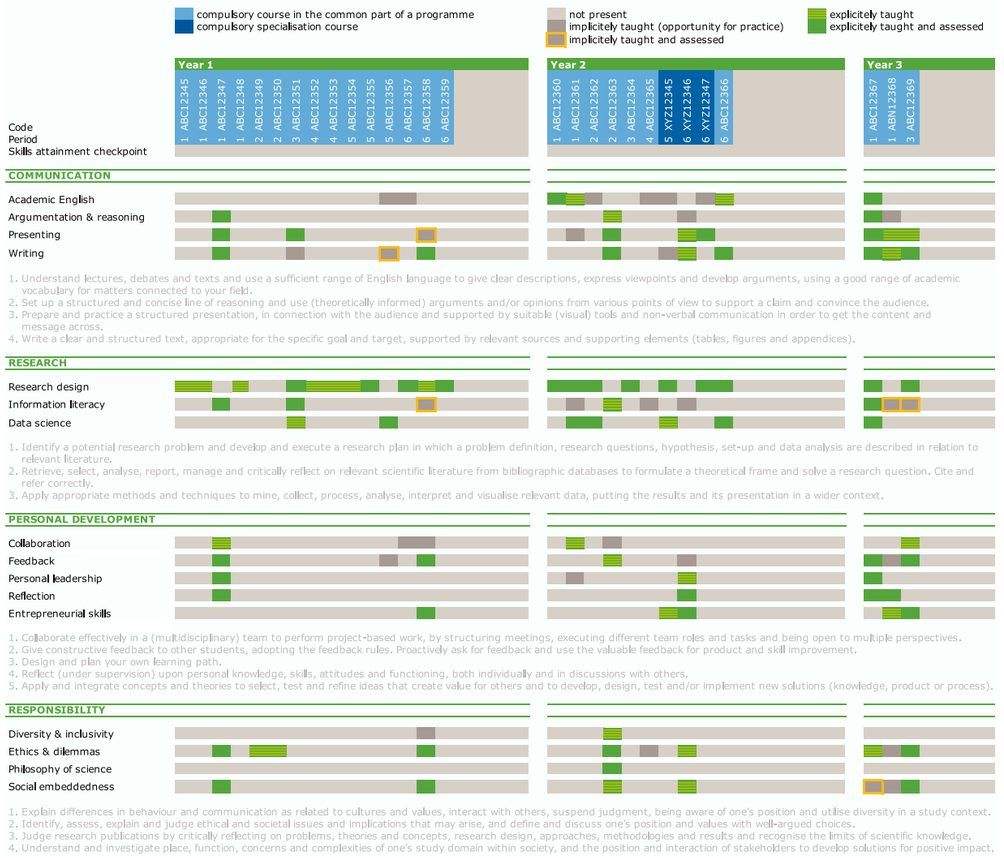
Curriculum manual. A curriculum manual is a way to give students a helicopter view of the curriculum. The manual clarifies the learning trajectories and the places of the various courses in the programme. The skills learning trajectories are described in such a way that students know where in the curriculum they are working on which skills and what is expected of them within those courses.

Longitudinal course. Some programmes choose to create a longitudinal course that extends over one or more years of the bachelor's degree. A longitudinal skills course makes students explicitly aware of the fact that they are working on their skills development. Such a course offers the possibility to develop separate learning activities and assessment tasks, as well as to build on or reflect on learning activities that students have carried out in other courses.

Portfolio. In a portfolio, students can collect products from different courses that demonstrate their skills development. If the assessment within these courses is aligned for this purpose, the products in the portfolio can collect evidence that students have reached the desired proficiency levels in one central place.

CURRICULUM FINGERPRINT (EXAMPLE)

The curriculum fingerprint provides an overview of where in the curriculum students work on developing their skills and when their performance is evaluated.



SUPPORT ENVIRONMENT

APPENDIX

These pages provide a comprehensive - but inevitably incomplete - overview of the support environment for (re)developing learning activities and assessment for skills education at Wageningen University and Research. A complete overview of services and products regarding education support is available on the intranet site of the Education Support Centre (ESC). ESC also provides a complete overview of all available training courses for educational staff.

EDUCATIONAL DESIGN AND TEACHER TRAINING		
The Design Lab	- Resources - Support - Peer expertise	The Design Lab welcomes teachers and programme committees who wish to rethink the design of their education or develop new education. The Design Lab facilitates design on different levels: course, learning trajectory and programmes as a whole.
(re)Designing a course	- Training	This course is designed for teachers at Wageningen University who are involved in designing or redesigning (parts of) a course. The self-study modules are available for experienced lecturers who would like to refresh their knowledge or are granted an exemption from the complete version of (re)designing a course in the UTQ.
Training & Advice	- Resources - Support - Training	The team Training & Advice (T&A) aims to facilitate teaching staff in their professional development. T&A offers courses, workshops and tailored advice to all employees with teaching duties at Wageningen University.
Education and Learning Sciences	- Resources - Support	ELS education involves a range of skills courses and activities, targeted at BSc, MSc and PhD students and professionals in the Wageningen fields. The courses focus on both the development of academic, professional and personal competencies.
Assessment quality	- Information - Resources	Here you will find information and inspiration on everything you want to know about assessment quality. This information guides you in designing assessments that comply with the accreditation guidelines of the NVAO (Accreditation Organization of the Netherlands and Flanders) and the regulations of the WHW (Higher Education and Research Act).

GENERAL TOOLS AND RESOURCES		
Online learning environment	- Resources - Support	This page links to support pages about specific digital learning tools: • Brightspace: learning management system • Turnitin: similarity check tool • H5P: tool to create and share interactive educational content • FeedbackFruits: interaction tool with and between students • LabBuddy: e-learning tool to make practicals more effective • Peek: application to organise involving and activating excursions • EdTool Advisor: tool to select the right educational tool that serves the purpose of a particular learning activity; includes an overview of all digital learning tools supported at WUR.
Showcases of learning activities	- Inspiration	A collection of showcases of learning activities on all kinds of topics, including group work, feedback and tools like H5P and Peek app.
Educational media	- Support	Here you will find all the information you need regarding the use of the recording studios, the camera training and the support from operators, multimedia experts and instructional designers.
Library for Learning	- Resources	The Library for Learning (L4L) is a portal to search and find educational resources created by Wageningen teachers. The portal includes hundreds of teaching materials from WUR, such as videos, e-modules, audioclips, and infographics. The L4L portal aims to be a source of inspiration and reusable material. How you can use, find, reuse and share all kinds of open educational resources is explained here.
4TU Innovation map	- Inspiration - Peer expertise	The four universities of technology in the Netherlands work together to boost engineering education in the Centre for Engineering Education (4TU.CEE). The Innovation Map provides information on education innovation projects at the 4TU, including access to tools, research results, promising practices and much more.
4TU Education innovation	- Inspiration - Peer expertise	WUR intranet platform for the 4TU.CEE about innovative education and modern learning environments, tools, best practices and research that helps to better reach (future proof) learning goals. Get inspired by meetings, blogs, newsletters and discusssion on innovative topics and education innovation projects.

RESOURCES FOR SPECIFIC SKILLS		
Skills communities (Teams)	- Peer expertise	There is a dedicated Teams site for the BSc Skills Learning Trajectories project. Here you can find all background information about the project and teacher communities for every skill.
Skills practice	- Training	The Skills Practice page provides an overview of all WUR courses, trainings and activities that students can sign up for, to get extra training regarding several skills.
Data science	- Resources	Various materials related to data science are being offered by many different organizations. Next to online courses such as MOOCs, it is also possible to enroll in courses offered by Wageningen University & Research or other (partner) institutions. Data Science Online Courses provides a WUR-curated selection of relevant courses.
Diversity and inclusivity	- Expertise	The DARE project works along 4 dimensions to tackle racism and discrimination in a broader sense. The project aims for an inclusive and safe working and study environment in WUR and is organized around 4 themes: Reporting, Culture & Awareness, Education & Research and WUR Documents & Policies. Also the team Training & Advice (T&A) offers training on intercultural classroom and boundary crossing for teachers.
Entrepreneurial skills	- Expertise - Support	StartHub Wageningen is the startup incubator and educator for students, PhDs and recent graduates of Wageningen University & Research. Their core focus is development of entrepreneurial competences of students and student entrepreneurs. StartHub offers various services, facilities and expertise.
Information literacy	- Resources - Support	The Library has developed a learning trajectory for information literacy. The trajectory aims to ensure that students from different bachelor programmes reach a similar level of information literacy at the end of their studies.
Social embeddedness	- Support	Society Based Education supports WUR teachers with creating university-society learning spaces, so that WUR students are introduced to their future knowledge domain, learn to apply their scientific knowledge in practice and they get the opportunity to engage and collaborate with other students and societal actors with various knowledge levels, cultures, disciplines and backgrounds.

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RESOURCES FOR SPECIFIC SKILLS		
Writing	- Support	The Wageningen Writing Lab offers a series of supporting activities for students of Wageningen University to help them improve their writing skills and develop new writing strategies. Information for teaching staff regarding this service is found here.
	- Resources - Support	The Library offers students tutorials, workshops and individual advice on searching and referencing information sources. The Library works with the Wageningen Writing Lab to assist students in both finding and managing information for their theses or essays. This support does not replace regular teaching in information literacy but supplements it.
	- Peer expertise - Resources	Thesis rings are networks of people who facilitate student peer feedback during the writing of their thesis. The page is meant for exchanging experiences and ideas and the group meets biannually.

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