

## Aligning vision and practice: Personal leadership development through academic and life experiences

Definition seen by BSc students of Earth System sciences programme in comparison to Wageningen University definition

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### 1. Introduction

In response to evolving demands in higher education, in its vision for education, Wageningen University (hereafter WU) stresses the development of responsible change makers for science and society through ownership for personal development, inspiring learning communities, and an agile curriculum in touch with the world around us [1]. This path, among other things, mandates personal and skills development achieved through programme domain courses or through specialized skills-focused courses. This institutional commitment to develop responsible change makers for science and society also reflects a broader recognition that technical expertise alone is insufficient preparation for the complex, interdisciplinary challenges students face in their professional careers. Personal leadership, defined by WU as *"taking responsibility for one's own actions, decisions, and outcomes; setting goals, making plans, and taking action to achieve those goals; being accountable for one's own learning and development; and taking steps to continuously improve skills and knowledge"*, has emerged as a central competency in this educational vision, and as such should become focus of students' development.

In the BSc Earth System Sciences programme (previously known as Soil, Water, Atmosphere, hereafter BSW, [2]), skills learning is implemented through a longitudinal Personal Development Path [3], spanning the three-year bachelor trajectory. The course is developed in response to recurring feedback from students and observations by the Programme Committee regarding limited attention to professional orientation and academic skills, disconnection between courses and real-world applications, student perception of the programme as unrelated "separate bricks," and lack of structured opportunities for reflection on study choices and future paths. The course is currently structured as a pass/fail course without formal ECTS credits, and as such it does not include traditional assessment methods in form of a paper written or oral exams.

Given this non-traditional assessment structure, reflection essays emerged as a natural and pedagogically appropriate means of evaluating student development. At the culmination of their BSc journey, students are asked to write comprehensive reflective analysis (up to 2000 words) that documents and synthesizes their personal leadership development. This assignment requires students to articulate their understanding of leadership, examine experiences from their curriculum coursework and extracurricular activities, critically analyze BSW-curriculum's role in their development, and project future growth trajectories. The structured template guides students through five key components: defining personal leadership, presenting their development journey with critical moments, analyzing curriculum effectiveness and gaps, outlining future development plans, and synthesizing their key insights.

The present study examines reflection essays from the 2022 BSc BSW cohort, a particularly significant group for two reasons. First, these students represent a post-pandemic cohort, having experienced their education during the return to normal campus life after COVID-19 disruptions. Second, and more importantly, this cohort is completing their BSc before the formal implementation of the structured Personal Development Path course. Their reflections therefore capture leadership development within

the existing curriculum structure, providing a natural baseline for understanding how personal leadership develops without explicit curricular scaffolding. This baseline is essential for evaluating the effectiveness of newly implemented development paths and for understanding the relationship between institutional intentions and student experiences.

Understanding student perspectives on personal leadership development is crucial for several reasons. First, it allows us to identify gaps between intended learning outcomes and actual student experiences, enabling students' vision on curriculum design. Second, it reveals which existing curriculum elements, such as courses, pedagogical approaches and types of experiences, naturally support leadership development. Third, it shows how students define and make sense of personal leadership, which may differ substantially from institutional frameworks (and theoretical models in the literature). Finally, student reflections offer insights into critical moments and experiences that shape development, informing both formal curriculum design and informal learning opportunities.

Through this study, I seek to answer the following question: "How do students conceptualize, experience, and develop personal leadership throughout their BSW bachelor education?" Specifically, I address the four interrelated themes: 1. Students definition of personal leadership in comparison to Wageningen Universities' definition. 2. Critical moments and experiences students identify as most influential for their personal leadership development. 3. Elements within the curriculum that students perceive as the most effective for their leadership development, and areas where the curriculum could improve. 4. Students' vision on their future development. By systematically analyzing students' reflection essays through these themes, this study aims to bridge the gap between the institutional vision and students' experience, providing evidence-based insights that can inform both the ongoing development of the Personal Development Path course and broader discussions about effective leadership education in the BSW bachelor programme, and beyond.

## 2. Methodology

To answer the research question of this study, I perform a qualitative content analysis of students' reflection essays on personal leadership development to understand how students conceptualize, experience, and develop personal leadership throughout their bachelor programme. All essays submitted by the 2022 BSc BSW cohort are included in this analysis (N = 18 essays up to now).

### 2.1 Assignment Structure

At the end of their BSc trajectory, students submit their individual reflection essays of up to 2000 words addressing five required components: an introduction defining personal leadership and describing their initial understanding of personal leadership, a personal leadership development journey presenting key development areas with concrete examples and identifying their top three critical moments, a curriculum analysis evaluating how the BSc BSW programme implements leadership development and suggesting improvements, a future development plan outlining specific goals with timelines, and a conclusion synthesizing their key insights.

Students are encouraged to draw upon their entire three-year BSc experience when reflecting on their leadership development. This includes their experiences in core courses such as Introduction to Environmental Sciences, Water 1, Integration course Soil Water Atmosphere, System Earth, Meteorology and Climate, Introduction to GIS, various field research courses, and other programme courses. Beyond formal coursework, students are also stimulated to consider group work experiences, exchange experiences, part-time employment, involvement in student associations such as Pyrus, sports clubs, and

other extracurricular activities. They are asked to reflect on how their interactions with peers, study advisors, and lecturers evolves throughout their studies, and to consider personal challenges and growth moments that shape their development. The assignment requires students to provide concrete examples of their development, grounding their reflections in specific experiences rather than abstract observations.

## 2.2 Data Analysis

To analyze students' essays, I use a hybrid approach combining analysis of predetermined essay structure with inductive identification of emerging themes and patterns within students' responses. This approach allows for systematic analysis of the five required essay sections while remaining open to unexpected insights and variations in how students articulate their leadership development experiences. The predetermined structure provides organized framework, but the analysis remains subjected to the diverse ways students interpret and respond to each component. The analysis is conducted in three interconnected phases that moves from familiarization to identification of systematic themes and patterns to synthesis.

In the first phase, all essays are read in their entirety to gain an overall understanding of the range and depth of students' reflections. This initial familiarization with students' overall experience provides essential context for the more systematic analysis that follows. It also allows for preliminary identification of recurring themes, and notable patterns and variations across essays.

The second phase involves systematic content analysis to identify patterns, similarities, and differences across essays. The analysis is structured according to the four interrelated themes, and the connections between these themes are also explored.

- First theme: my analysis focuses on how students define personal leadership, and I compare these definitions to WU definition on personal leadership. Students' definitions are screened for key conceptual elements including responsibility, self-awareness, goal setting, accountability, continuous learning, self-direction, and growth mindset; concepts emerging from the vision for education [1] and Skills for Changemakers project [4]. Here, I categorize the degree of alignment with the institutional definition, and I document additional frameworks that students use in their definitions. This reveals whether students expand upon, modify, or propose alternatives to the university's definition.
- Second theme examines critical moments and experiences, i.e., the analysis extracts the top three critical moments students describe as important for their development and categorizes types of mentioned experiences. This includes specific courses, group projects, field research, exchange programmes, extracurricular activities, personal challenges, and evolving interactions with peers, advisors, and lecturers. Beyond simply cataloguing these experiences, I examine what made moments "critical" from students' perspectives and identify patterns in both the timing of experiences across the three-year programme and the nature of these experiences.
- Third theme requires analyzing both what works well and what could be improved in the BSW curriculum. For effective elements, I extract specific courses, pedagogical approaches, and programme features that students identify as contributing to their leadership development, categorizing these by type such as group work experiences, individual assignments, field research, and exchange opportunities. Simultaneously, I identify gaps, missed opportunities, and explicit criticisms that students raise about their programme. Students' concrete, actionable suggestions for curriculum enhancement are then extracted and analyzed to understand which

courses or programme aspects they feel could better integrate leadership development, and why.

- Fourth theme focuses on future development plans as students state their goals for continued leadership development. I categorize the identified goals by timeframe, distinguishing between short-term goals within the next year, medium-term goals for five years ahead, and longer-term aspirations extending to ten years (or even beyond). Here, I examine themes such as MSc plans, career directions, specific skills students aim to develop, as well as the concrete actions they plan to take to achieve their goals.

In the third phase, obtained insights are synthesized to identify dominant themes and patterns across essays, variations and outliers in student experiences and perspectives, and relationships between different aspects of leadership development. For example, I explore whether and how students' definitions of personal leadership relate to the types of critical moments they identify as important for their development, or how their curriculum critique connects to their future development plans. This synthesis phase moves beyond description to interpretation, generating evidence-based insights relevant for future curriculum development.

### 2.3 Quality Assurance

To ensure analytical rigor, I read essays multiple times to verify emerging themes, and to check that representative quotes accurately reflect identified patterns. Outlier cases, i.e., essays that diverge significantly from common patterns in terms of form, writing style and approach to the defined assignment, I examine carefully to understand the full range of student's experiences, and to avoid overlooking minority perspectives.

## 3. Results

### 3.1 Student conceptions of personal leadership

Of the 18 analyzed essays, only one explicitly adopts the WU's definition of personal leadership, fully addressing its components of responsibility, goal-setting, and continuous learning through proactive study choices, personal initiatives, and reflection on self-development. Two others express closely aligned views, emphasizing accountability, deliberate decision-making, and self-directed growth, while most students present more personal or alternative interpretations of the concept. Students' perspectives on personal leadership are thus clustered into three main components arising naturally from the overall definition of personal leadership [1]: responsibility and accountability, goal setting and action, and self-direction and growth (Figure 1).

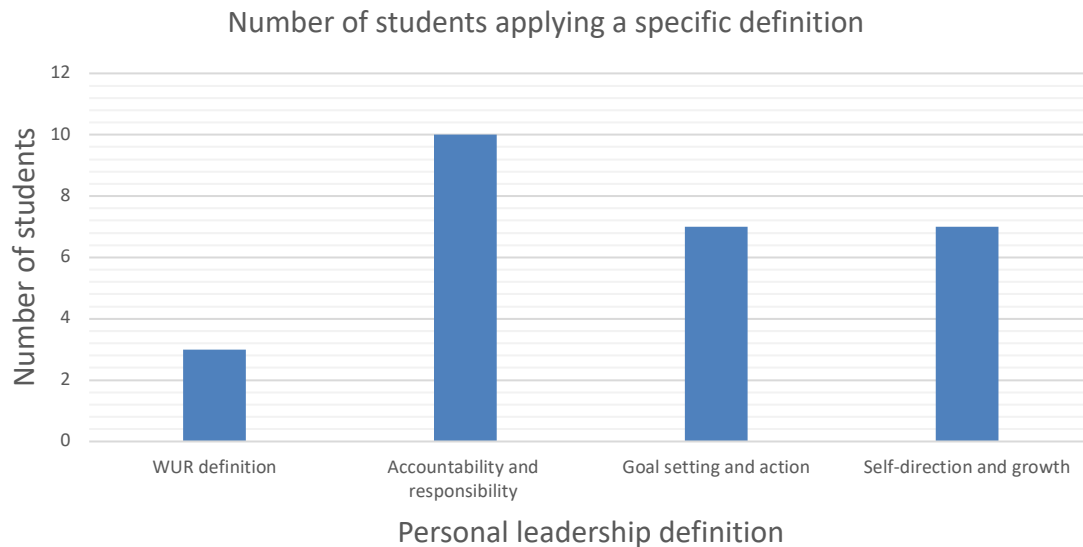


Figure 1: Column diagram displaying number of students in the cohort that apply specific definition of personal leadership. Note that one student can use multiple definitions to express their view on personal leadership.

Accountability and responsibility (N = 10) are overall defined as ownership of one's own actions, choices and development, and being accountable for the outcomes that follow. Many students emphasize not only taking responsibility for mistakes and decisions but also at actively directing their own learning process rather than expecting knowledge to be passively provided. Further, students commonly define personal leadership in connection to goal setting and action (N = 7), through setting meaningful goals, creating clear direction, and taking deliberate actions to pursue these goals. Their views, thus, highlight consciously chosen paths aligned with their personal ambitions and having commitment to follow through. Finally, students view personal leadership as an ongoing process of self-direction and growth (N = 7) through self-awareness, reflection and intentional development. They associate it with understanding their own strengths, weaknesses and values, and use these insights to make decisions and grow.

When comparing students' perspectives with WU's definition of personal leadership, it becomes clear that students largely agree with the core elements of taking responsibility, setting goals, acting on them, and committing to continuous development. However, they consistently *expand* the institutional definition by adding emotional, motivational, and relational dimensions (Table 1).

In accountability and responsibility, WU emphasizes taking responsibility for one's actions, decisions, and outcomes. Students adopt this view but expand it by linking accountability to trustworthiness and reliability in relationships, suggesting that *responsibility is not only individual but also social in nature*. Further, in goal setting and action, WU focuses on setting goals, making plans, and taking action. Students agree but shift the emphasis from the sole planning to the *quality and meaning of the goals themselves*. They argue that personal leadership requires pursuing intrinsically motivated goals that provide direction, resilience, and sustained effort. Finally, in self-direction and growth, WU highlights accountability for learning and continuous improvement. Students build on this by describing growth as an intentional, reflective process that requires deep self-awareness. They stress recognizing strengths, weaknesses, values, and emotions as essential starting points for meaningful development, i.e., elements that are not explicit in the WU definition. Additionally, students complement the personal leadership definition by

framing personal leadership as also emotional and relational: involving intrinsic motivation, resilience, learning from failure, and, for some, supporting or empowering others.

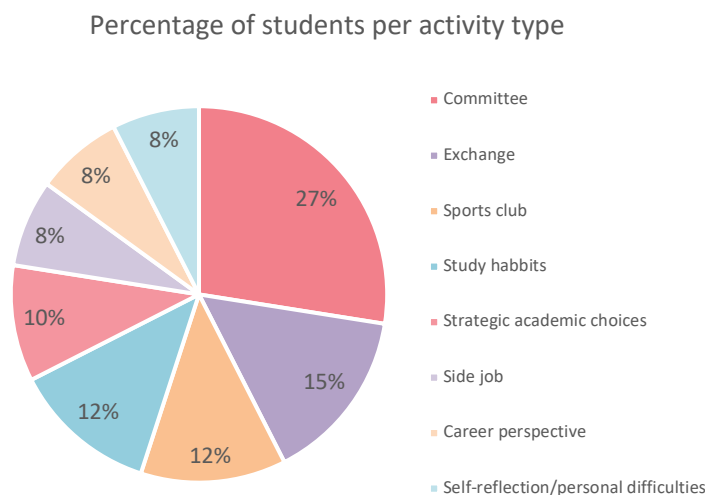
**Table 1: Comparison between WU definition and students' perspectives on personal leadership.** First column gives components extrapolated from the overall WU definition on personal leadership while the second column connects these components with more extensive definitions. Third column gives an overall (summarized) students' perspective and as such expanding the definition per component, while the fourth column narrows the definition of personal leadership per component, taking into consideration WU vision and students' perspective on personal leadership.

Components	WU definition	Students' perspective (expanding the definition)	Students' perspective (narrowing the definition)
Accountability and responsibility	Taking responsibility for one's own actions, decisions, and outcomes. Being accountable for one's own learning and development.	Accountability is relational: building trust, being reliable, and acknowledging how actions impact others.	Responsibility is not only about correcting mistakes but about consistently showing dependable behavior.
Self-direction and growth	Taking steps for continuously improve skills and knowledge.	Growth requires self-awareness, emotional insight, reflection, and flexibility—processes that precede meaningful improvement.	Improvement is not generic; it must be guided by knowing strengths, weaknesses, values, and personal competencies.
Goal setting and action	Setting goals, making plans, and taking action to achieve these goals.	Goals must be personally meaningful and intrinsically motivated to sustain long-term effort and resilience.	Action is effective only when goals are aligned with one's values and sense of purpose, not only when a plan is followed.
Evolverment and focus	Implicit: focus for one's own responsibility for development and outcome.	Personal leadership also involves emotional resilience, learning from failure, and, for some, supporting or empowering others.	Development is not solely self-oriented; it includes managing internal drivers (motives, emotions) that shape behavior.

In summary, students' view on personal leadership generally aligns with the core elements of the WU definition but their views add important nuances that broaden and deepen the meaning of personal leadership. They emphasize that accountability is not just individual but relational, that self-awareness is a necessary foundation for growth, that meaningful and intrinsically motivated goals drive sustained action, and that personal leadership includes emotional and supportive dimensions. To make these differences clearer, Table 1 summarizes how students both extend and refine the WU definition across the key aspects of personal leadership.

### 3.2 Critical moments contributing to personal leadership development

Students identify a wide range of activities and experiences as pivotal for their personal leadership development. These can be grouped into three overarching categories: extracurricular and organizational involvement, academic challenges, and personal growth and self-management. Across all categories, the unifying feature is that students value situations that push them outside their comfort zones, require self-management, and foster responsibility, adaptability, and decision-making skills (Figure 2).



**Figure 2: Pie chart representing percentage of students in the cohort defining specific activity type as important for their personal leadership development. Note that one student can define multiple activities as important for their leadership development.**

Extracurricular and organizational involvement includes participation in committees of study associations and sports clubs, as well as side jobs that involve responsibility or leadership roles. These experiences help students develop organizational, communication, and professional skills, as well as confidence in managing teams and responsibilities. Notably, committee involvement (see Figure 2) is the most frequently mentioned activity (11 students or 27% of the cohort), followed by exchanges (6 students, i.e., 15%), and sports clubs (5 students, i.e., 12% of the cohort).

Academic challenges comprise high-independence projects, strategic academic choices, and demanding coursework. Experiences such as the bachelor thesis, compulsory courses, and minor's selection require students to independently design, execute, and manage complex tasks while making informed, strategic decisions about their learning. High-demand courses and group-based assignments support the development of coordination, critical thinking, and planning skills. Strategic academic choices are noted by 4 students (10% of the cohort), while courses requiring high independence or specialized skills are identified as formative by about 8% of cohort.

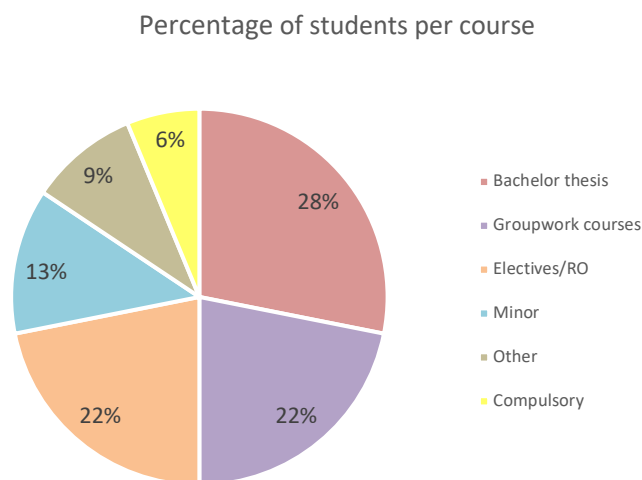
Personal growth and self-management encompass study habit changes, self-reflection, deliberate handling of difficult moments, and proactive career exploration. Students report that refining their study approaches, implementing daily reflection, overcoming challenges, or managing their career trajectory builds resilience, self-awareness, and intrinsic motivation. Study habit changes, self-reflection, difficult personal moments and career-focused activities are each mentioned by 3 students (8% of the cohort). Side jobs additionally bridge this category with practical responsibility and time management experiences (3 students).

In summary, students link their personal leadership development to a wide range of extracurricular activities, academic experiences, and moments of personal growth. Across these categories (Figure 2), they consistently describe that the most meaningful experiences are those that push them beyond their comfort zones, require self-management, and demand conscious decision-making. Whether through committee work, exchanges or study-habit changes, students say that these experiences help them become more aware of their strengths, take responsibility for their choices, and navigate complex tasks

more independently. Taken together, their reflections suggest that students view personal leadership not as tied to a single type of activity, but as emerging from repeatedly engaging in situations that require initiative, adaptability, and intentional learning.

### 3.3 Curriculum analysis

Students describe a wide variety of courses as meaningful for their personal leadership development, and their reflections cluster around two overarching themes: independent academic responsibility and skill-focused activities. What students highlight aligns closely with their own definitions of personal leadership: taking responsibility for one's decisions, planning and following through on goals, and engaging in continuous self-directed growth. Rather than viewing leadership as separate from coursework, students consistently frame learning experiences as central to understanding themselves and managing complex academic challenges.



**Figure 3:** Pie chart representing percentage of students in the cohort defining specific courses as important for their personal leadership development. Note that one student can define multiple courses as important for their leadership development.

High-independence academic projects emerge as especially influential. The bachelor's thesis, identified by nine students (Figure 3), stands out as the most frequently mentioned individual course. Students describe it as the first moment in their studies where they "had to rely entirely on themselves", take ownership of a long-term project, and make strategic decisions without constant supervision. Similarly, students who point to minors, electives and/or restricted optional courses (mentioned by seven and four students, respectively) explain that these choices help them shape their academic paths intentionally, reinforcing their understanding of leadership as self-direction and mindful decision-making. Students repeatedly emphasize that working independently or designing their own academic trajectory helps them recognize their strengths and weaknesses, a theme they also stress in their definitions of leadership.

Skills-focused activities form the second major cluster. Groupwork courses, highlighted by seven students (22% of the cohort), are often described as moments when students need to communicate clearly, coordinate tasks, and address problematic group dynamics. Many report that these experiences make them more confident in voicing opinions and more aware of the interpersonal dimensions of responsibility. Students similarly describe challenging compulsory or other content-heavy courses (reported by two to three students) as opportunities to build discipline, structure their learning, and cope



with academic pressure. These reflections show that students perceive skill-demanding courses as strengthening their adapting, planning, and collaboration, i.e., competencies they themselves associate with effective personal leadership.

Taken together, the distribution shown in the pie chart (Figure 3) illustrates that students experience leadership development across a spectrum of course types rather than within a single curricular category. High-independence projects (e.g., bachelor thesis, electives, minors) account for the largest proportion of meaningful experiences, while groupwork and other skills-focused courses form an equally substantial component. Across all categories, students consistently report that leadership growth occurs when courses require them to take initiative, confront uncertainty, and translate knowledge into action. In this sense, the course experiences they describe mirror the central elements of personal leadership as defined both by the students and by the WU framework: responsibility, goal orientation, accountability for learning, and continuous personal development.

Across the curriculum, students consistently identify a gap in personal leadership development (see Table 2) within highly theoretical and strongly structured courses, particularly in the first two years. Courses such as mathematics, physics, chemistry, statistics, and early domain-focused subjects are described as instruction-driven, leaving little room for autonomy, initiative, or role-taking within groups. Students also point out that groupwork-heavy courses often lack explicit role structures, making leadership opportunities inconsistent and dependent on group composition rather than design. Moreover, several courses, including skills-focused modules and applied science courses, are viewed as missing opportunities for structured reflection, which students see as essential for developing self-awareness and leadership. Finally, some courses are considered too rigid or overly guided which in turn limits students' ability to make decisions, plan their own work, or connect course content to real-world contexts. Collectively, these perspectives suggest a clear student desire for more intentionally designed opportunities to practice leadership through increased autonomy, open-ended assignments, defined team roles, and integrated reflection moments across the curriculum.

**Table 2: Courses (or clusters of courses) identified as needing better personal leadership development.**

Course or course type	Why it lacks personal leadership?	Suggested improvement
Basic theoretical courses	Courses are too theoretical, rigid, and “just studying”, there is little room for initiative, collaboration, or leadership practice.	Add applied elements such as small group tasks with role-rotations within mini-projects, introduce moments of making choices or self-direction to build ownership.
Early group-work courses without clear role division	Group-work often lacks explicit task division or leadership opportunities: students report unbalanced participation and unclear expectations.	Add structured collaboration that requires rotating roles (chair, planner, coordinator) and appoint group leaders. Ensure mentor guidance for first-year students who need support.
Highly structured courses	Too little freedom for students to make decisions, plan work, or take initiative which limits development of independence, self-direction, and leadership.	Increase autonomy by allowing students to choose topics, design parts of the project or set their own planning.
Courses lacking reflection or personal-skills components	Personal leadership is often implicit, reflection on performed tasks is absent or optional, and students forget or deprioritize it.	Add short reflective assignments (especially after major assessments), integrate a personal leadership development module at the start of the programme and introduce periodic check-ins or portfolio elements.

Courses relying mostly on group-work with little individual output	Students report limited personal accountability and insufficient development of individual writing, critical thinking, or self-reflection skills.	Add individual writing assignments, opinion essays, or solo reflections and create a better balance between individual and group work to allow for personal growth.
Technical courses without guidance on process	Students feel lost, especially in early years. Insufficient building of skills and competences prevents them from taking ownership of their learning process.	Provide clearer breakdowns of project steps and more structured support in year 1, and guidance on planning and teamwork before autonomy is expected.
Courses with limited exposure to real-world examples or careers	Students lack understanding of why they study certain topics and how skills connect to their possible future careers which hinders motivated, purposeful leadership development.	Include discussion of real-world applications, small career sessions, presentations from professionals, and links between content and possible career paths.

In summary, students' suggestions closely mirror their own definitions of personal leadership: they call for more opportunities to take initiative, make decisions, and work independently, because they see leadership as self-direction and responsibility. Their emphasis on clearer group roles aligns with their view of leadership as relational and collaborative, while requests for more reflection and individual assignments reflect their belief that leadership requires self-awareness and intentional growth. Overall, students ask the curriculum to provide more explicit, structured, and authentic moments to practice the competencies they associate with effective personal leadership.

### 3.4 Students' future action points

When reflecting on their future, students connect partly with WU's vision of structured growth but also extend it in meaningful ways that emphasize resilience, well-being, and intrinsic purpose.

Students articulate clear goals for continuing their personal leadership development, which can be grouped into short-, medium-, and long-term goals. Short-term goals (within one year) largely center on preparing for or beginning their MSc studies, strengthening essential academic and professional skills, and implementing concrete behavioral changes. Many students aim to improve specific competencies such as communication, confidence in group settings, public speaking, decision-making under pressure, time management, and writing skills. Others plan to adopt structured routines including reflection journals, mindfulness practices, agenda use, or study habit adjustments to build consistency and self-awareness. This timeframe is also where students outline the most concrete actions, such as taking a student assistant role, improving Dutch language proficiency, seeking out group presentations, or engaging with professionals for career exploration.

Medium-term goals (one to five years) involve gaining clarity about their professional direction as they progress through or complete their MSc. Students commonly express intentions to deepen specialization such as pursuing hydrology, ecology, meteorology, teaching, or municipal/environmental work, and to secure internships or early jobs aligned with their emerging identity as young professionals. Leadership development in this period is framed as becoming more confident and autonomous in project leadership, decision-making, and professional communication. Several students plan to use this phase to strengthen their practical experience, expand networks, or test whether a chosen field is a good personal fit.

Long-term aspirations (ten years and beyond) reflect broader visions of meaningful, purpose-driven careers and lives. Students often describe wanting to work in roles where they can contribute to sustainability, nature conservation, public service, or scientific knowledge. Others emphasize maintaining

personal wellbeing, flexibility, and continued growth as core leadership values. Across the cohort, long-term leadership development is not framed as achieving a particular status, but rather as becoming a grounded, confident, and adaptable person able to navigate complex professional and personal environments. Some students articulate more defined ambitions such as completing a PhD, becoming a weather presenter, working in education, or pursuing high-level athletic goals.

Across all timeframes, the unifying pattern is that students view personal leadership as an ongoing, intentional process. They combine specific skill development, strategic academic and career planning, and concrete actionable steps to structure their future growth, demonstrating a strong alignment between their current self-understanding and their long-term aspirations.

Students' goals for leadership development reveal a balance between skill acquisition, personal growth, and long-term purpose. In the near future (MSc / 1-5 years), they focus on developing professional skills, improving self-confidence, and strengthening resilience, while managing stress and avoiding overreliance on external validation. Over the longer term (5 years and beyond), aspirations shift toward intrinsic fulfillment, meaningful contributions to society and the environment, and sustained personal growth, with leadership seen as an ongoing process that integrates career, well-being, and adaptability rather than formal recognition or titles alone.

## 4. Discussion

### 4.1 Students' Expanded View of Personal Leadership

The analysis reveals that students largely embrace WU's core definition of personal leadership: taking responsibility, setting goals, and committing to continuous learning, but consistently **expand** it with emotional, motivational, and relational dimensions (Section 3.1, Table 1). Where WU emphasizes individual accountability for learning outcomes, students stress that accountability is also relational, involving trust and awareness of impact on others. Where WU focuses on goal-setting, students emphasize that goals must be intrinsically motivated and personally meaningful. Most notably, students add that leadership requires deep self-awareness, emotional resilience, and for many, the capacity to support others, dimensions largely absent from the institutional definition.

This expansion reflects broader generational values around authenticity, well-being, and purpose-driven work. Students' long-term aspirations (Section 3.4) prioritize meaningful careers, societal contribution, and sustained personal growth over status or external recognition. Rather than representing a limitation, this expanded view may indicate students are developing a more holistic approach to leadership, approach that retains WU's structured development framework while grounding it in sustainable, intrinsically motivated practice.

### 4.2 The Individual Framing of Collaborative Experiences

A notable pattern emerges in how students describe their development: they tend to frame even collaborative experiences (groupwork, committee involvement, exchange programs) through the lens of personal growth, i.e., what *they* learn about themselves, how *they* develop confidence or organizational skills. While students clearly value collaboration as group-work courses are identified as formative by 22% of the cohort, committee involvement by 27% ( see Figures 2-3), they extract primarily individual lessons rather than explicitly recognizing learning from peers or the pedagogical design that created conditions for their development.

This individualized framing likely reflects multiple factors: the assignment's explicit focus on **personal** leadership development, students' natural tendency to evaluate their own progress, and possibly broader cultural trends toward individualism. However, it raises an important pedagogical question: do students fully recognize how their individual capabilities are shaped by the learning community around them through e.g., instructor guidance, peer interactions, and integrated curriculum design?

#### 4.3 Curriculum Design: Strengths and Concrete Opportunities

Students' curriculum analysis (Section 3.3, Table 2) provides constructive, actionable insights rather than fundamental critiques. They identify the bachelor thesis, minors, and electives as most effective for leadership development (Figure 3) precisely because these experiences require sustained independence, strategic decision-making, and ownership. This confirms that the curriculum already contains strong models, but that these models should be extended to earlier years (Table 2).

Students' suggestions for improvement closely mirror their expanded definition of personal leadership: they request more opportunities to practice initiative and decision-making in theoretical courses, clearer group roles that build relational accountability, structured reflection to support self-awareness, and stronger real-world connections. These recommendations are specific and implementation-ready, targeting early-year theoretical courses, groupwork without defined roles, highly structured assignments with limited autonomy, and courses lacking reflection components.

#### 4.4 Epistemological considerations

The findings align with established theories of learning that emphasize the construction of knowledge through personal experience. Kolb's experiential learning theory [5] conceptualizes development as cyclical process in which individuals interpret and refine their capabilities through concrete experience and reflection. Similarly, Knowels' framework [6] of self-directed learning positions learners as individuals who define their own learning needs, set their goals and evaluate progress. These two perspectives on learning support the interpretation which suggests students operate from an **experience-based, self-directed epistemology** of leadership development: viewing capabilities as emerging through acting, experimenting, and making sense of personal experiences.

This however contrasts the WU's Vision for Education 2025, which reflects a **collaborative, community-based epistemology** assuming leadership develops through interaction within learning communities. The data do not suggest that students *cannot* learn collaboratively or from others. Rather, they suggest students may not yet fully articulate or metacognitively recognize the collaborative dimensions of their learning. The assignment structure itself – asking students to reflect on **personal** leadership – may have reinforced this individualized framing. Moreover, since this cohort completed their BSc before formal implementation of the Personal Development Path, they lack explicit curricular scaffolding to help them recognize and articulate collaborative learning processes.

#### 4.5 Limitations

This study has several limitations. The analysis relies on self-reported reflections subject to social desirability bias, selective memory, and retrospective interpretation. The sample represents one cohort from one programme at one institution, limiting generalizability. Students' experiences are filtered through their individual perspectives at one point in time, i.e., at the end of their BSc education, meaning that their earlier experiences may have been reinterpreted. The predetermined essay structure may have shaped how students organized their reflections, potentially emphasizing certain aspects over others.

Finally, the assignment's focus on "personal" leadership may have inherently encouraged individualized framing, making it difficult to determine whether students' emphasis on individual development reflects their actual learning processes or the assignment's implicit direction.

## 5. Conclusion

This study examined how BSc Earth System Sciences (BSW) students conceptualize, experience, and develop personal leadership throughout their bachelor education. The analysis of 18 reflection essays reveals four key findings that directly address the research question:

**How students conceptualize personal leadership:** Students embrace WU's core definition of taking responsibility, setting goals, and committing to continuous learning, but meaningfully expand it with relational, emotional, and motivational dimensions. They emphasize that accountability is relational (building trust, considering impact on others), that goals must be intrinsically motivated to sustain effort, and that leadership requires deep self-awareness and emotional resilience (Section 3.1, Table 1).

**Critical experiences for development:** Leadership development occurs through diverse experiences spanning extracurricular involvement (committee work 27%, exchanges 15%), academic challenges (bachelor thesis 50%, minors, electives), and personal growth moments. What makes these experiences formative is not their category but their shared characteristics: requiring initiative, involving uncertainty, and demanding self-management (Sections 3.2-3.3, Figures 2-3).

**Curriculum effectiveness and gaps:** Students identify high-independence projects (thesis, minors, electives) as most effective because they require sustained autonomy and strategic decision-making. They request more structured opportunities for leadership development in early-year theoretical courses, clearer role structures in groupwork, integrated reflection assignments, and stronger real-world connections (Section 3.3, Table 2).

**Future development vision:** Students view leadership as an ongoing process integrating professional skill development, personal well-being, and purpose-driven contributions to society and environment. Their aspirations reflect generational values emphasizing intrinsic motivation, work-life balance, and meaningful impact over status or external recognition (Section 3.4).

### 5.1 Key implications for educational practice

**Making collaborative learning more visible:** Students benefit from collaborative experiences but may not fully recognize learning from peers and instructors. Structured reflective exercises could help students articulate collaborative contributions alongside individual outcomes.

**Extending high-independence experiences:** Since students identify independent projects as most formative, introducing more structured autonomy in years 1-2 through rotating leadership roles, choice-driven assignments, or mini-projects could strengthen early leadership development.

**Integrating reflection throughout:** Embedding reflection assignments after major assessments, particularly in theoretical courses, could develop the self-awareness students associate with leadership while making collaborative learning elements more visible.

**Strengthening real-world connections:** Explicitly framing theoretical courses as building blocks for applied work could improve engagement and metacognitive awareness of curriculum design.

## 5.2 Bridging institutional vision and student experience

This study reveals both alignment and productive tension between WU's institutional vision and BSW students lived experience of leadership development. Students embrace the university's emphasis on responsibility, goal-setting, and continuous learning, but insist these elements must be grounded in intrinsic motivation, emotional sustainability, and relational awareness to be effective. This is not rejection of WU's vision but rather a generational reframing that retains core commitments while emphasizing authenticity, well-being, and purpose-driven practice.

The challenge for curriculum development is twofold:

- First, to help students recognize and articulate how their individual capabilities are shaped by collaborative learning environments, i.e., instructor guidance, peer interactions and integrated curriculum design. The assignment's focus on "personal" leadership may have reinforced individualized framing and future iterations could include prompts that explicitly ask students to reflect on learning from others.
- Second, to extend the high-autonomy and high-reflection elements students identify as most effective (thesis, minors, electives) into earlier years through rotating leadership roles, choice-driven assignments, and structured reflection after major assessments.

The students' curriculum analysis provides an implementation-ready roadmap: introduce applied mini-projects with role rotations in theoretical courses, make groupwork structures explicit with defined leadership roles, integrate reflection assignments particularly in years 1-2, and strengthen real-world connections to help students understand how foundational knowledge supports later independence. By building on students' expanded understanding of personal leadership rather than viewing it as a deficit, WU can cultivate both the individual self-direction and collaborative capability needed for effective leadership in addressing complex, interdisciplinary challenges.

Ultimately, this baseline study, capturing leadership development before formal implementation of the Personal Development Path, reveals that students are already developing substantial leadership capabilities through existing curriculum and extracurricular experiences. The opportunity now is to make these developmental processes more visible, intentional, and explicitly collaborative, while continuing to support the self-awareness, intrinsic motivation, and independent capability students already demonstrate.

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