



ELEVATE-WISE STEM for Women Mentorship and Training Program

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1. Introduction

Co-funded by the Erasmus+ Programme of the European Union, ELEVATE-WISE is a project that aims to stimulate female students' interest in STEM careers and their prospects of accessing these demanding niche markets through their education. The consortium of 8 partners (including 2 European HEIs; 1 from Spain and 1 from Portugal and 4 HEIs from Sub-Saharan Africa; 2 from Ivory Coast and 2 from Cape Verde) work together to achieve results that include the launch of the ELEVATE-WISE STEM for Women Mentorship and Training Program.

ELEVATE-WISE project aims to provide a holistic and multi-level approach, with impact in the following way:

- Empowering women by improving their STEM competences and developing new skills for life and work.
- Reducing the gender gap in access to careers in STEM fields.
- Improving the quality of education, in particular for women, while at the same time ensuring equal participation in STEM jobs.
- Supporting the upskilling of the young population

The main added value for the beneficiary universities will be the promotion of women's interest in STEM subjects, the increase of their career opportunities in these niches, the development of their skills to become role models for students at an earlier stage, and the strengthening of their social commitment to contribute to both the ethical and economic development of their societies. The project will address the above aspects mainly by developing STEM focused training resources, mentoring models with training programmes, service-learning programmes implemented by universities, train-the-trainer courses and workshops targeted at key stakeholders to gain their commitment to the project and its objectives.

This will be achieved by adopting a practical and active methodology that enables female students to solve real problems, in particular, the challenges they face in Ivory Coast and Cape Verde.

This document presents the theoretical framework and the pedagogic approach that will be used in the design of a mentoring model for the universities that highlights the contributions of women in STEM in their country and provide guidance and support to aspiring female students in STEM. It also presents the training program structure that will be supported by the development of a STEM Education HUB, the templates that will be used, and the timeline and the distribution of tasks among partners.

2. Contextual framework

2.1. Women in STEM Education

STEM skills are essential to address pressing Sustainable Development Goal challenges in today's technology-driven world. However, not all citizens participate equally in these areas of knowledge, as there remains a glaring gender gap in science, technology, engineering, and mathematics (STEM) and women are significantly underrepresented in these crucial fields. Despite progress in some areas, the participation of women in STEM careers remains persistently low, and several factors contribute to this gap, reflecting systemic, social and cultural challenges that hinder the full inclusion of women in these fields.

Data show that only about 30% of female students enrolled in higher education worldwide choose to study STEM careers, with female enrolment particularly low in ICT (3%), natural sciences, mathematics and statistics (5%) and engineering, manufacturing and construction (8%), and higher in health and social work (15%). Moreover, these overall averages mask significant differences between regions and countries, with, for example, the proportion of students enrolled in natural sciences, mathematics and statistics varying significantly from 16% in Ivory Coast to 86% in Bahrain, and the proportions of students enrolled in engineering, manufacturing and construction being low in North America, Europe and Africa, specifically in Africa sub-Saharan, including the two beneficiary countries, Ivory Coast and Cape Verde.

Thus, there is a clear gender pattern in higher education in these two countries, where male students are in the majority in engineering, manufacturing and construction studies, information and communication technologies, and female students are in the majority in education or the arts.

One of the main factors behind this gender pattern is the stereotype that is perpetuated from an early age, which shapes social expectations about gender roles. Toys, media and social norms often discourage girls from taking an interest in STEM subjects. Consequently, this discouragement can lead to a lack of confidence and interest in STEM subjects among girls, which has an impact on their educational choices later in life. On the other hand, girls' interest, participation and success in STEM can be negatively affected by gender stereotypes that imply that STEM studies and careers belong to men. Girls who internalise these stereotypes tend to have lower levels of self-esteem and less confidence in their abilities than boys. Self-esteem, in turn, has a significant impact on both academic performance in STEM

subjects and aspirations for STEM careers. As a result, these stereotypes may discourage girls from pursuing STEM careers.

Furthermore, another factor is the scarcity of female role models and mentors within the STEM domain. The absence of visible women in influential positions within these fields serves as a barrier for aspiring female professionals. The lack of representation can limit opportunities for mentorship, guidance, and inspiration, hindering the progression of women in STEM careers.

Lastly, the workplace environment in STEM fields can also pose challenges for women. Instances of gender bias, discrimination, and unequal opportunities persist, creating barriers to career advancement. Work cultures that are not inclusive or accommodating to women, particularly in male-dominated environments, contribute to a hostile or unwelcoming atmosphere. Moreover, the work-life balance dilemma often impacts women disproportionately, discouraging them from pursuing or remaining in demanding STEM careers. Balancing family responsibilities with the demanding nature of many STEM professions can be overwhelming, leading many women to opt for alternative career paths.

All these social and cultural factors are present in both countries; Ivory Coast and Cape Verde where women face inadequate representation in decision-making roles and the substantial burden of family obligations, pulling them away from active participation in public life.

Addressing all these issues, particularly the low participation of women in STEM careers, requires multifaceted solutions. Initiatives aimed at fostering an early interest in STEM among girls through educational programmes, mentoring opportunities and exposure to diverse role models are essential. Additionally, promoting awareness and challenging stereotypes through educational campaigns are crucial steps toward breaking down societal barriers and fostering a more inclusive STEM community.

2.2. Contextual alignment

Over the past thirty years, a global trend towards market liberalisation has led several nations to prioritise the mastery and use of STEM as key drivers of economic growth, development, and security. In line with this, the 2030 Agenda promotes STEAM education as a centre to cultivate transformative, innovative, and creative thinking and skills to strive for sustainable development and turn learners into empowered citizens who engage in problem-solving at local, national and regional levels.

In keeping with this, numerous African countries have devised national policies to foster STEM education. While these policies align with national development objectives, there exists a notable gap between the intentions outlined in the policies and their practical execution. This disparity arises from various challenges, including cultural and social factors, as well as inequalities and exclusions rooted in African STEM education and training programs.

In this context, UNESCO reports that while most African countries have achieved universal primary education, there are still significant gender disparities in STEM fields, despite efforts to address the gender gap. Consequently, the economic development gap between Africa and other regions has widened because of African countries lagging behind the rest of the world in STEM education, undermining the innovative potential of African countries.

It is well known that a variety of strategies need to be implemented in order to successfully close the gender gap in STEM education. These strategies include encouraging female participation in specialized programs, mentorship initiatives, capacity building in digital technologies, and exposure to opportunities. In this regard, examples in Ivory Coast and Cape Verde include initiatives and programs aimed at promoting gender equity in education and the involvement of women in STEM fields.

For instance, in Ivory Coast some of the initiatives that have emerged are THE GENDER CLUB created by the Ministry of Women's Affairs in the framework of the Generation Equality programme, and the UN sub-programme "HE FOR SHE" which works for equity and equality between male and female students, and also for equal opportunities in the university environment. Another initiative is, THE SCIENCE AND TECHNOLOGY SECTION FOR WOMEN OF THE UAO which helps young women to succeed in the field of science and technology and guides them in their choice of academic path, with the main objective of fighting discrimination in the field of science and technology.

In the case of Cape Verde some several institution and organizations offer different types of support to women, including facilitating access to education. Three stand out: ICIEG, the Institute for Gender

Equality and Equity which functions as a space for integration and horizontal articulation of the Government's sectoral measures related to gender equality issues and women's capacity building, OMCV is a non-governmental Women's Organisation that fights for the dignification and promotion of women, and ACLCVBG Association for the Fight against Gender Violence focused on the prevention and promotion of Human Rights, Education for Citizenship, combating and preventing all forms of violence and discrimination against women and girls.

Despite efforts, the data from HEIs' beneficiaries in Ivory Coast and Cape Verde reflects the persistent gender gap:

In the University Alassane Ouattara (UAO) there are 9,523 female students from the total of 22,670 male in 2022-2023. By fields: Humanities: female (6,374); male (8,394), Economics: female (1,078); male (2,098), Legal sciences: female (1,688); male (1,681), Medical Sciences: female (261); male (501), STEM: female (115); male (437).

According to data from the Félix Houphouët-Boigny University (UFHB), with 50,000 students enrolled at undergraduate and doctoral level, the gross enrolment ratio (GER) in higher education is higher for boys than for girls. Moreover, the number of male students in Humanities is higher than that of female students in STEM fields. For example, for the academic year 2022-2023 in Languages, Literatures and Civilisations there are 46,3% female students and 53,7% male students, while in the Faculty of Materials Science and Technology there are 12,9% female students and 87,1% male students.

At the University of Santiago (SCC), there are 896 women, to a total of 436 men. This means that women represent 67% of students, so slightly above national average. When considering only STEM-related degrees (from the areas of Engineering, Health and Management), these represent a total of 834 students, 406 of them being women, representing 48,9% of the STEM students. If excluding the Nursing degree (the most numerous and with 151 female students enrolled), then women are only 257, out of 659, representing only 38,9% of students.

In the case of the University of Cape Verde (UNICV), there are a total of 9,255 higher education students, of which 5,687 (61,4%) are women and 3,568 men (38,6%). However, there are some gender differences in terms of the choice of courses, as some have attracted more attention from boys than from girls. Reference is made to the courses of Physical Education and Sports, Marine Machinery Engineering, Electrical Engineering. On the other hand, other careers have attracted

girls to the detriment of boys, for example, careers in Health and Education, such as Nursing, Education Sciences, Public Relations and Executive Secretarial or Psychology.

These figures indicate that the four beneficiary universities in Ivory Coast and Cape Verde continue to exhibit a male dominance in STEM fields. To understand the reasons behind this, several challenges have been identified, including entrenched gender norms, stereotypes, and prejudices, which serve as significant barriers to the underrepresentation of women in STEM. These barriers often discourage girls from pursuing STEM careers and also contribute to women dropping out of these fields of education.

Specifically, the following needs and challenges have been identified in the Sub-Saharan African region, particularly in Ivory Coast and Cape Verde at the educational and academic levels:

- **Limited Access to Quality Education:** Access to quality education remains a significant issue, especially in rural areas. Girls may encounter barriers such as inadequate infrastructure, lack of educational resources, and long distances to schools, which impact their ability to pursue STEM subjects.
- **Gender Bias in Educational Settings:** Stereotypes and biases within the educational system can discourage girls from pursuing STEM subjects. Teachers' perceptions, curriculum content that may not be inclusive or diverse, and gendered expectations can influence girls' self-perception and interest in STEM fields.
- **Lack of Role Models and Mentorship:** The scarcity of visible female role models and mentors within STEM fields at the academic level can hinder girls' aspirations. Without relatable figures to look up to or guidance from women in these fields, girls may lack the necessary encouragement and support to pursue STEM education and careers.
- **Insufficient Outreach and Awareness Programs:** Inadequate or limited outreach programs aimed at encouraging girls to explore STEM fields contribute to the lack of interest. Awareness campaigns, workshops, and exposure to hands-on STEM activities are crucial to ignite interest and demonstrate the possibilities within these career paths.
- **Socio-Cultural Norms and Expectations:** Prevailing societal norms and traditional gender roles may discourage girls from pursuing STEM education. Cultural expectations regarding women's roles and careers could impact their decision-making regarding academic pursuits and professional aspirations.

- **Educational Infrastructure and Resources:** Inequities in access to STEM-related resources, laboratories, and technology can further hinder girls' engagement and success in STEM subjects. Unequal distribution of resources can limit opportunities for practical learning experiences.

3. Mentoring Model

3.1. Model principles

ELEVATE-WISE project aims to provide a mentoring model for the universities that will highlight the contributions of women in STEM in their country and provide guidance and support to aspiring female students in STEM. This should be a mentoring model for girls that functions as a STEM Education HUB, offering a comprehensive programme of activities before and during university studies.

At the end of the project, the HEIs involved in the project will have a tested mentoring model for improving the access and the university experience of girls in STEM careers.

Moreover, addressing these challenges at the academic level will require a collective effort from all stakeholders in the consortium countries. This is precisely why ELEVATE-WISE aims to establish a global network covering all essential profiles. In collaboration with the consortium, this network will participate in the design of specific interventions. These interventions will focus on empowering Ivory Coast and Cape Verde to raise the participation of women in STEM careers, thus cultivating a more diverse and innovative workforce.

Thus, the mentoring model and the STEM Education HUB should have:

- A flexible design, capable of adapting to local conditions, and accommodating various stakeholders. Insights from governance and learners will shape its evolution.
- Multi-stakeholder engagement: involvement of actors from academia, public administration, industry, and civil society.
- A participatory approach: prioritizing participatory methods in design, implementation, and monitoring, fostering active involvement of all stakeholders.
- Co-creative dynamics: transformation into a conscious community will be co-creative, encouraging innovative relationships between actors with complementary roles, fostering cross-sectorial and transdisciplinary collaborations.

Mentoring programs types

Mentoring has traditionally been defined as a method of professional and personal development where a person with expertise in a particular field or area of research (the mentor) advises and guides someone (the mentee) in that particular area or on specific skills (Treasureid et al., 2022).

The distinction between who is a mentor and who is a mentee can be fluid and changeable, and there may be a shift in roles within the same context. The understanding of mentoring has evolved and it is now seen as a complex, collaborative, interactive process. There are various types of mentoring relationships, which depend on several factors, including the objectives of the mentoring relationship, the needs of the mentor and mentee, and the contexts in which they develop. There may be different levels of involvement, frequency of meetings and encounters, and mentoring relationships may be formal or more informal in nature. Mentors and mentees may be involved in several mentoring relationships at the same time, and mentoring relationships may evolve over time as needs and goals change.

Most mentoring will fall into one of the following types¹:

DYAD | In the traditional dyad mentoring model, mentees are paired with more experienced mentors, often with institutional support. Successful dyad mentorships require active participation, with equal responsibility shared between mentors and mentees.

PEER | Peer mentoring consists of two or more people, often similar in experience or rank, interacting as equal mentoring partners to achieve mutually determined goals. Peer mentorship is collaborative in nature, where each member provides mentorship to the other by providing guidance, expertise, support, counsel and advice while bringing out each member's finest skills, providing opportunities to pool knowledge and strengthen relationships.

GROUP | Group mentorship is where one mentor supports a group of interdependent mentees who hold themselves individually and collectively accountable to a common purpose of learning and development. Group mentoring provides opportunities for discussion and socialization, encouragement and support.

CONSTELLATION | Constellation mentoring is when one mentee has multiple mentors who take active interest and action to advance the mentee's development. Constellation mentoring allows

¹ Barrette-et al (2019). *The Mentorship Guide for Teaching and Learning*.
<https://dx.doi.org/10.11575/PRISM/dspace/40983>

mentees to experience mentors with different styles of mentoring and leadership, providing rich and in-depth understandings of multiple teaching and learning practices. Furthermore, having multiple mentors provides mentees with greater opportunities to expand their networks.

Mentoring programs design

A mentoring program design and implementation could be handled following Instructional System Design, by including three main phases: analysis, design/develop and evaluation.

Analysis: In order to design a mentoring program, different perspectives, talents, skills, tendencies and attitudes of those who affect implementation process or are affected must be determined. Also, context and content analysis should be conducted.

Design/Development: In this phase, an activity plan must be shaped in accordance with needs analysis. Mentoring strategies and materials must be defined and mentoring activities must be determined.

Evaluation: The evaluation of the mentoring process is important in terms of determining the achievement level of goals and the changes that should be made. The parts should express their opinions objectively for a meaningful evaluation process. Mentoring process is evaluated by reports received by both mentor and mentee.

Table 1. Questions to be asked to design a mentoring program²

Analysis	• What is the purpose of the mentoring program? • What is the problem and how can the problem be solved? • What is the context? • What is to be done? • What should be taught? • Who will be taught? • What are the mentor's/mentee's characteristics? • What are the objectives?
Design/Development	• How will the mentoring be planned? • What will be included in the plan? • Which media and tools are effective? • Which strategies and techniques will be utilised? • Which parameters will prevail in implementation? • How is the appearance and sound of materials?

²Sucuoğlu, H. (2018). Design and Implementation of Mentoring Programs. <https://dx.doi.org/10.4018/978-1-5225-4050-2.ch017>.

	• Do materials meet needs? • Do learners learn from materials? • How can materials be improved?
Evaluation	• Did the mentoring program leave a positive impression? • To what extent are the objectives achieved? • What are the influences of program? • Which changes are required? • What are the strong and weak points of the program?

Adapted from Sucuoglu (2018)

3.2. Benefits of mentoring programmes

Mentoring relationships have mutual benefits for mentors and mentees, including that of helping create communities committed to helping one another develop academically and professionally.

Several benefits for mentors, mentees and communities could be identified³:

Benefits for mentors

Mentorship may help mentors to:

- Reflect on and improve their own practice as they interact with and learn from their mentees.
- Experience the pleasure of helping a student begin his or her career, choose a new career path, or reach a desired goal.
- Experience professional development, personal satisfaction, improved interpersonal skills, improved job satisfaction and enjoyment of the stimulation and challenge.
- Develop a renewed sense of commitment, continuous learning and career development, building of reputational capital, enhanced leadership skills and satisfaction of giving back to the community.

Benefits for mentees

Mentorship may help mentees to:

- Gain feelings of being valued team members and develop sense of belonging.
- Share their own expertise with their mentors.
- Develop confidence, learn more effectively and acquire new perspectives.

³ Barrette-et al (2019). *The Mentorship Guide for Teaching and Learning*.
<https://dx.doi.org/10.11575/PRISM/dspace/40983>

- Receive advice and guidance on how to succeed and have effective role models and sounding boards for their concerns and ideas.
- Benefit from hearing about pertinent encounters and feelings experienced by mentors.
- Expand professionally through networking opportunities and by having additional insights into career options and transitions.
- Gain increased access to educational programs, increased learning skills and potential career advancement.

Benefits for community development

Mentorship may help communities:

- Gain perspectives on mentorship as valuable to the development of the community as a whole.
- See mentorship as a manifestation of the commitment to lifelong, ongoing learning.

3.3. Mentoring phases

Mentoring is a process consisting of several phases, namely, 1. Recruitment of mentors and mentees, 2. Matching and training, 3. Implementation, and 4. Closure (Sucuoglu, 2018⁴).

Figure 1. Phases of Mentoring



Adapted from Sucuoglu (2018)

3.3.1. PHASE 1 | Recruitment

The biggest challenge in many mentoring programs is the recruitment and selection phase for mentors and mentees. If either party lacks the appropriate qualifications or dedication to participate in the program, the mentoring relationship is likely to fail. Individual characteristics, cultural context, race and gender issues, and expectations on both sides influence the success of the mentoring program.

Mentors are individuals who are responsive, interested, sharing and highly conscientious along with having a strict work discipline. Mentors must be acknowledged experts, providing confidence, listening and supporting the mentee carefully, easily reachable, stimulating mentee for achieving the objectives, counselling properly at convenient time and place. They also must be helping mentees solving their problems. Moreover, mentors must have intellectual knowledge and be eager to keep updated. Besides, they must have positive feelings about their own success and profession, prevent negative purpose and behaviours, get pleasure in helping others, be glad and eager to work in their fields.

Mentoring process is a relationship based on confidence. Healthy communication is an absolute must to obtain the maximum efficiency from this relationship. It is crucial that mentor must fulfil his/her responsibilities in order to obtain the objectives in a healthy mentoring relationship.

In addition, mentee is also supposed fulfil his/her responsibilities for the same purpose. Another important thing is that mentees should be eager to learn new things and implement them. Moreover,

⁴ Sucuoglu, H. (2018). Design and Implementation of Mentoring Programs. <https://dx.doi.org/10.4018/978-1-5225-4050-2.ch017>

they should also be good listeners, learners, communicators, innovators and implementors of what he/she learns. Effective and willing participation of mentee in the mentoring process increases the quality and input of the process.

Success of the mentoring program depends on the facts that mentees and mentors have an open and cooperative attitude and stay loyal to the process.

Document templates are available for this phase in section 3.5.1.

3.3.2. PHASE 2 | Matching and Training

Matching

Establishing a suitable match between mentors and mentees is extremely important to ensure the success of a mentoring programme. It is important to address objectives, expectations, interests, and needs, and try to avoid incompatibilities. Completely random matching should be avoided, and questionnaires and/or personal interviews should be conducted to help determine characteristics that guide the matching process.

At the beginning of a mentoring relationship, a contract should be signed between the mentee and the mentor, which clearly states the responsibilities and expectations and the agreed work plan. There are some rules and ethical values that must be followed by both the mentee and the mentor, and both must be mindful of confidentiality and the protection of each other's interests. At the beginning of a mentoring relationship, expectations, restrictions, desired goals and progress, the mode and frequency of communication, and how the mentoring relationship will be evaluated should be made explicit (see next section for more on this).

Production of content for the mentoring program

When preparing a mentoring programme, it is essential to develop guides for mentors and mentees. These guides should provide a set of useful and relevant information that can be widely used by mentors and mentees, allowing them to have guidance and greater confidence in performing their roles.

Mentors' training

When preparing a mentoring programme, a training structure should also be developed for mentors and/or mentees, allowing for widespread and cyclical use. This training should provide consistent knowledge about the design and development of the mentoring program, as well as the sharing and exchange of experiences on how mentoring works.

This training should be provided at the outset, when each mentor or mentee joins the mentoring program, and may take the form of short courses and/or training workshops (lasting 3 to 6 hours).

Section 3.5.2 provides some examples of tasks that can be used in mentors' training.

3.3.3. PHASE 3 | Implementation

After the initial phase of matching mentors and mentees, the next step is to implement the mentoring program, where it is important to follow the design that was conceived. Proper implementation of the different steps and timely identification of difficulties are crucial to the program's success. The initial phase of building each mentoring relationship is essential and should include defining a common vision and goals, a work plan and a timetable for achieving these goals, and clarifying each party's expectations.

Identify Needs

Strong, mutually beneficial mentoring relationships are built when there is clarity about the needs of both mentee and mentor. Initial conversations should explore the needs and expectations of all involved in the mentoring relationship. These open and honest discussions will become particularly important when the members of a mentoring relationship do not know one another before entering their relationship. Dedicating time and space for discussion will reduce the chance that the relationship fails to meet the needs and expectations of all involved.

Goal setting

In mentoring process, it is important to set correct goals. In order to set the goals, mentor and mentee must come together and determine achievable and realistic goals according to the needs. Therefore, goals must:

- Be realistic
- Be achievable
- Meet the needs
- Be measurable
- Be limited by a specific time period
- Be manageable
- Be motivating

Behaviour

Successful mentoring begins with commitments from both mentors and mentees to establish and build their relationships. Engaging in an authentic manner, being honest in acknowledging what you can offer

and being transparent about your limitations helps foster trust. It is important to be realistic regarding areas of expertise and to recognize that other mentors may be needed to meet all the identified needs. Mentoring from a place of humility creates a space for both mentees and mentors to garner benefits. Recognizing that engaging in mentoring relationships can expose vulnerability, it is important that mentees and mentors are mutually respectful and maintain confidentiality. Although mentoring relationships may evolve over time (i.e., by becoming friendships), it is important to initially consider expectations surrounding time commitment.

Communication

Clear communication between mentors and mentees goes a long way to helping sustain relationships and contributing to their success. Purposefully establishing communication frequency and outlining clear plans detailing expectations around response and preparation will help promote success. It is important to consider coming up with a strategy for managing conflict, miscommunication or any possible communication breakdowns. Mentees have often been hesitant to “bother” their mentors with “silly questions” when their mentors are obviously such busy people. Conversely, mentors who were not being asked for help did not want to interfere in their mentees’ lives by seeming pushy, and thus did not contact their mentees without express invitation.

This concern for mentoring partners’ freedom, time and independence can lessen the impact and usefulness of mentoring relationships. Mentees need to share their questions and concerns through effective communication, so that mentors can fulfil their responsibilities. In addition to discussing if mentee and mentor needs are being met or how those needs may have evolved, it is equally important to schedule opportunities for periodic check-ins to address how mentoring relationships are going.

A mentorship plan is a great strategy for accomplishing this phase. Document template is available for this phase in section 3.5.3.

3.3.4. PHASE 4 | Closure

Closure is the last step in a mentoring process. In this phase, evaluation of the program must be done. All data obtained during program must be examined by an evaluation committee and a general decision about the program must be concluded after evaluating the levels of objective accomplishments. Establishing mentor and mentee accountability evolves from clear understanding of one another’s needs, goals and expectations. Clearly articulating goals, outlining strategies to achieve them and assessing their effectiveness helps both mentors and mentees outline responsibilities associated with mentoring relationships.

Being intentional in planning helps mitigate losing perspective and interest over time, in addition to managing challenges associated with a lack of time. Ongoing reflection around long-term goals and identifying changing mentorship needs are important for both mentees and mentors.

It is important to recognize that some mentoring relationships that have been successful and beneficial for both mentees and mentors naturally end. Achieving closure around the mentoring relationship and debriefing successes and challenges informs future mentorship involvement. It is also important to consider that some mentoring relationships progress into friendship. As the mentoring relationship evolves, it is essential to be transparent and discuss what the mentoring will look like and how it will be navigated within the friendship.

During times of mentorship transition and closure, mentors and mentees should reflect on the strengths and challenges in mentoring relationships. Spending time reviewing what worked and what didn't allow mentors and mentees to identify areas for future mentorship development.

It is important to understand that engaging in mentorship demonstrates a commitment to lifelong learning. These times of transition and closure present valuable opportunities for reflecting and developing future goals.

Document template is available for this phase in section 3.5.

3.4. Activity Plan

During the development and implementation of a mentoring program, there are a number of activities that can be essential to ensuring the program's success. Therefore, a longitudinal activity plan appropriate to the local context should be defined, fostering community engagement.

Such plan could include initiatives as:

Development of a web page about the mentoring program

This page plays a fundamental role in publicising the mentoring program (both globally and locally in each HEI), as it provides extensive information about the program and access to all issues relating to its conceptualisation and publications, namely its guiding principles, structural axes, objectives, and organisational and coordination structure. In addition, it simultaneously presents news, events, highlights, teams and various program's documents, seeking to provide a more complete and interesting experience for different users.

Production of videos and other digital content related to the mentoring program

In this context, different materials can be produced and made available on digital platforms. Those can have different characteristics, and should present the mentoring program and its local activities. It would be extremely relevant for the videos to be produced by mentors and mentees.

Holding meetings, seminars and workshops

These could be key activities in the success of the mentoring program, where multiple initiatives can be developed and carried out, maintaining an intense and cross-cutting dynamic throughout the program. These activities should be directed to mentors and mentees, as well as to the various stakeholders in the program. A diversity of initiatives, aimed at all students (and not just mentors and mentees), could emphasised the cross-cutting nature of the program, contributing to better integration and to the development of a sense of belonging.

3.5. Mentoring Toolbox

The templates proposed in this section are only a starting point, with suggestions regarding structure and content, allowing each partner HEI to build a version that is graphically and textually adapted to its specific context.

3.5.1. Recruitment of Mentors and Mentees

Before joining a mentoring program, both mentees and mentors should reflect on their intrinsic motivations, intentions, goals and desired outcomes. It is important to take some time to reflect on what each person wants to get out of a mentoring programme and to talk to others to compare views and expectations about mentoring. The most successful mentoring relationships happen when everyone has already reflected on their definitions, preferences, and motivations. This initial reflection and discussion will help ensure the success of the mentoring relationship and mutual benefits for everyone involved.

Table 2. Questions for mentors

Before engaging in mentorship, it is important to assess your readiness by understanding what mentorship involves, considering whether mentorship is right for you, and determining your motivations. It is important to reflect on what is driving you to participate in a mentoring relationship.

- What interests me about being a mentor?
- What are my goals and what do I hope to learn from the experience?
- Am I interested in contributing to the growth and development of other people?
- Am I willing to commit time and energy to fostering a productive mentoring relationship?
- Am I interested in analysing my skills and experience, and sharing this reflection with another person?
- Am I willing to learn alongside my mentee?
- Am I willing to provide critical feedback?
- In what form of mentorship am I interested in participating?
- How many mentees do I want to work with? Am I open to working with a mentee from a distance?
- How might this align with my professional development plan? What aspects do I want to strengthen in my own practice?

Adapted from Barrete *et al.* (2019)⁵

Table 3. Questions for mentees

Before engaging in mentorship, it is important to assess your readiness by understanding what mentorship involves, considering whether mentorship is right for you, and determining your motivations. It is important to reflect on what is driving you to participate in a mentoring relationship.

- What interests me about being a mentee?
- What are my goals and what do I hope to learn from the experience?
- Am I willing to commit time and energy to fostering a productive mentoring relationship?
- In what areas of my training/practice am I most interested in receiving help?
- Am I willing to learn alongside my mentor?
- In what ways am I willing to receive and act on feedback?
- In what form of mentorship am I interested in participating?
- How many mentors do I want to work with? Am I open to working with a mentor from a distance?
- How might this align with my educational/professional development plan?

Adapted from Barrete *et al.* (2019)

3.5.2. Mentors' training

Mentors' training should provide consistent knowledge about the design and development of the mentoring program, as well as the sharing and exchange of experiences on how mentoring works.

Examples of tasks that can be used in mentors' training are giving.

Figure 2. Task: Do we know what mentoring is?

Focus: Orientation in the issue of mentoring

⁵ Barrette-*et al.* (2019). *The Mentorship Guide for Teaching and Learning*.
<https://dx.doi.org/10.11575/PRISM/dspace/40983>

Aims: To define mentoring, the role of mentoring in the development of mentees competences, how a mentor understands their position, and the mentoring support

Interaction patterns: individual work, team work

Material/Tools: table below

Procedure: Trainees read the statements listed in the table individually. They then express their agreement or disagreement with the content of the different statements and write it in the table. Afterwards, in team work, trainees reflect and discuss about the reasons for their decision.

Statement	Yes / No	Reasons
Mentoring is oriented at the assessment of a mentee.		
The relationship between a mentor and a mentee is related to individuals within a similar subject.		
A mentor must possess a strong and authoritative personality.		
A mentor is always an older colleague.		
An excellent professional is always and excellent mentor.		
The relationship between a mentor and a mentee is always asymmetrical.		
Mentoring is oriented at the cohesion of professional knowledge of mentees.		
Mentoring is focused on the development of professional skills and potential in a particular field.		

Adapted from Gadusova et al. (2022)⁶

⁶ Gadušová et al. (2022). MENTOR TRAINING. Materials and Tasks. University of Ostrava. https://ec.europa.eu/programmes/erasmus-plus/project-result-content/427303f8-449e-4b32-9b82-cad3d60bea35/MENTOR_TRAINING_Eng_e-book.pdf

Figure 3. Task: Factors influencing a mentor's work

Focus: Being aware of factors influencing a mentor's work

Aims: To evaluate the factors important for a mentor's work

Interaction pattern: individual work, group work

Material/Tools: table below

Procedure: Trainees read the statements in the table below and think about the significance of the factors regarding the success of a mentor's work. They mark their significance with a tick on the scale 0 – 3 (0 – unimportant, 1 – slightly important, 2 – important, 3 – very important).

	MENTOR:	0	1	2	3
1	<i>is familiar with mentee's environment, follows its changes</i>				
2	<i>is aware of the mentee's strengths and weaknesses</i>				
3	<i>trusts colleagues but not blindly without observing their actions</i>				
4	<i>considers difficulties as challenges that must be faced and solved</i>				
5	<i>deals with problems and solves them in an open way</i>				
6	<i>involves mentees in creating plans</i>				
7	<i>is tolerant and empathetic when mentoring the mentee</i>				
8	<i>states new goals after evaluating the achieved ones</i>				
10	<i>considers team work important and supports it in various ways</i>				
11	<i>has good communication skills</i>				

12	<i>is able to accept smart arguments, to admit his or her own faults, and to improve his or her own drawbacks</i>				
13	<i>is able to delegate tasks and make decisions, if necessary</i>				
14	<i>is able to think constructively, understands processes from the point of planning to implementation</i>				
15	<i>works hard to reach goals</i>				
16	<i>maintains a high-quality level of work</i>				
17	<i>is able to create an engaged and friendly environment supporting creativity</i>				
18	<i>supports innovative activities of mentees</i>				

Adapted from Gadusova et al. (2022)⁷

3.5.3. Mentorship planning forms

The relationship between mentor and mentee can be characterized as an educational relationship that mediates and engages individuals in mutual learning, relationship building, and support. Mentoring is not a one-time act, but a long-lasting process that is usually subject to a predetermined plan, which is modified during the joint work.

Preparation for mentoring⁸

⁷ Gadušová et al. (2022). MENTOR TRAINING. Materials and Tasks. University of Ostrava. https://ec.europa.eu/programmes/erasmus-plus/project-result-content/427303f8-449e-4b32-9b82-cad3d60bea35/MENTOR_TRAINING_Eng_e-book.pdf

⁸ Gadušová et al. (2022). MENTOR TRAINING. Materials and Tasks. University of Ostrava. https://ec.europa.eu/programmes/erasmus-plus/project-result-content/427303f8-449e-4b32-9b82-cad3d60bea35/MENTOR_TRAINING_Eng_e-book.pdf

Preparation for mentoring could begin with answering questions as:

What will be the frequency of mutual contacts?
Should the mentor be available outside the allotted hours?
Which method of contact to choose (face-to-face, phone, videoconference, emails ...)?
How long will the cooperation last?
How will confidential information be handled?

It is important for the mentor to make their own reflection on what they can provide to the mentee. The mentor deals with the questions:

What am I competent in and what can I pass on to the mentee?
What preparation is needed for different meetings with the mentee?
What experience has helped me in the similar situation?
What I will do with the mentee?
What areas should the mentee analyse and explore?
What does the mentee need for their development?
What could the mentee encounter and face in their training and development?

Based on the needs judgment, in a process of mutual dialogue, the mentor should guide the mentee to set their own goal(s). It is useful to discuss what goal(s) could be both challenging and achievable for the mentee. At the same time, the mentor's role is to align long-term goals with interim goals and goals for a specific meeting.

Mentoring Partnership Plan

A sample of mentoring partnership plan is presented below that can be used at the start of mentoring relationships to discover the needs and expectations of both mentors and mentees.

Figure 4. Template for Mentoring Partnership Plan

Mentoring Partnership Plan

Name of mentor(s):

Name of mentee(s):

Frequency of meetings:

1. Guidelines for mentorship

1.1. Needs:

Mentee(s):

Mentor(s):

1.2. Expected behaviours:

Mentee(s):

Mentor(s):

1.3. Roles and responsibilities:

Mentee(s):

Mentor(s):

1.4. Confidentiality and off-limit topics:

1.5. Strategies for managing conflict if it arises:

2. Key mentorship goals

2.1. Learning goals:

2.2. Professional development goals:

2.3. Indicators of success:

2.4. Potential barriers to success:

2.5. Actions to mitigate barriers to success:

3. Planning and organization

3.1. Preparation of meeting agendas: Do you wish to make use of these? If so, who will prepare them?

How far in advance of the meeting shall they be made available?

3.2. Progress report before each meeting: Do you wish to make use of these? If so, who will prepare them? How far in advance of the meeting shall they be made available?

Signatures of agreement:

Mentee(s)

Mentor(s)

Date:

Adapted from Barrete et al. (2019) ⁹

3.5.4. Assessment of mentorship

These templates that can be used to inform the assessment of the mentoring relationship.

Figure 5. Template for assessing mentoring as a mentor

Assessing mentoring as a mentor

How have I tried to support my mentee?

⁹ Barrette-et al (2019). *The Mentorship Guide for Teaching and Learning*.
<https://dx.doi.org/10.11575/PRISM/dspace/40983>

What have I learned from my mentee?

In what ways has my mentee been a good role model?

What aspects of the mentorship contributed most to my learning and development?

What are my mentee's areas of strength?

What suggestions can I offer my mentee to grow in this role?

Which goals did my mentee help me identify and achieve?

What meaningful learning am I bringing to my practices?

In what ways have I tried to be a good mentor?

How open have I been to guidance and feedback?

What are my strengths as a mentor?

How might I improve in terms of being a good mentor?

Adapted from Barrete (2019)¹⁰

Figure 6. Template for assessing mentoring as a mentee

Assessing mentoring as a mentee

How has my mentor given me guidance and support?

What have I learned from my mentor?

In what ways has my mentor been a good role model?

What aspects of the mentorship contributed most to my learning and development?

What are my mentor's areas of strength?

What suggestions can I offer my mentor to grow in this role?

Which goals did my mentor help me identify and achieve?

What meaningful learning am I bringing to my practices?

In what ways have I tried to be a good mentee?

How open have I been to guidance and feedback?

How have I tried to reciprocate and support my mentor?

What are my strengths as a mentee?

¹⁰ Barrette-et al (2019). *The Mentorship Guide for Teaching and Learning*.
<https://dx.doi.org/10.11575/PRISM/dspace/40983>

How might I improve in terms of being a good mentee?

Adapted from Barrete (2019)¹¹

¹¹ Barrette-et al (2019). *The Mentorship Guide for Teaching and Learning*.
<https://dx.doi.org/10.11575/PRISM/dspace/40983>

4. STEM Education HUB

This document provides a mentoring model that should function within a STEM Education HUB, offering a comprehensive program of activities before and during university studies. These activities will focus on empowering Ivory Coast and Cape Verde to raise the participation of women in STEM careers, thus cultivating a more diverse and innovative workforce. At the end of the ELEVATE-WISE project, the HEIs involved in the project will have a tested mentoring model for improving the access and the university experience of girls in STEM careers. Moreover, addressing these challenges at the academic level will require a collective effort from all stakeholders in the consortium countries. This is precisely why ELEVATE-WISE aims to establish a global network covering all essential profiles. In collaboration with the consortium, this network will participate in the design of specific activities.

4.1. Pedagogical Principles

The STEM Education HUB could be described as a Mentorship and Training Program. This program aims to raise the participation of women in STEM careers through pairing girls with mentors, providing guidance and practical exposure to STEM fields.

The activities developed within the STEM Education HUB should follow some principles:

Grounded Learning Practices: Learning practices should be carefully aligned with specific objectives, ensuring that students gain a deep understanding of the subject matter. The approach should enhance disciplinary skills, allowing students to apply theoretical knowledge in practical and real-world situations.

Engagement in Well-Defined Tasks: Students should be actively involved in well-defined tasks, promoting hands-on experience and active participation. The tasks should be designed to be challenging yet achievable, fostering a sense of accomplishment and skill development.

Formative and Summative Assessment: Both formative and summative assessments will be integrated into the activities. Formative assessments should occur throughout the process, providing continuous feedback for improvement, while summative assessments evaluate overall achievement and understanding.

Meeting Genuine Community Needs: The activities should be tailored to address authentic community needs, ensuring that the efforts contribute meaningfully to the well-being of the community.

The activities should be designed to have a tangible impact, emphasizing the practical application of academic concepts to real-world challenges.

Providing Meaningful Tasks for Students: Students are given tasks that are not only relevant to their academic development but also have a meaningful impact on the community. This fosters a sense of purpose and responsibility among students, connecting their learning to real-world social issues.

Promoting Communication and Collaboration: Activities should encourage open communication and collaboration between students and community members. Students learn to navigate diverse perspectives, communicate effectively, and work collaboratively, promoting a sense of community engagement.

With its focus on community service objectives, the STEM Education HUB should enhance motivation by providing students with real-world relevance, meaningful contributions, personal connections, autonomy, social interaction, skill development, a sense of long-lasting impact, and experiential learning opportunities.

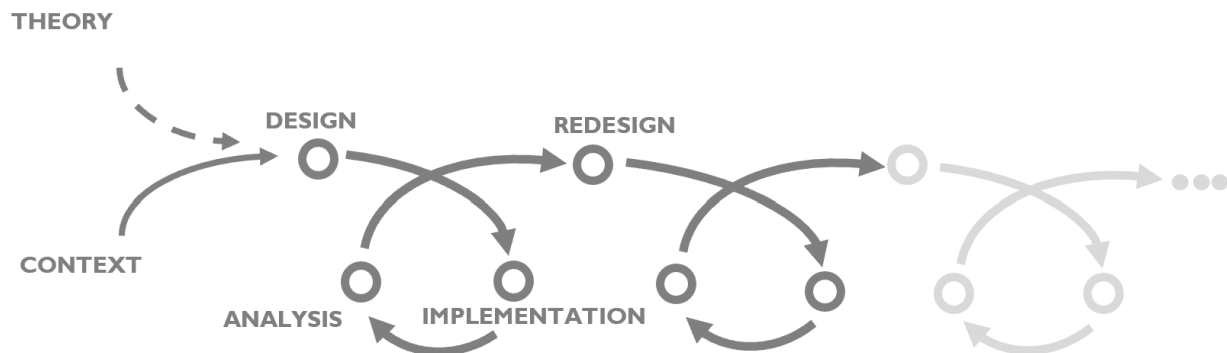
A Design-Based Research approach

The ELEVATE-WISE project follows a Design-Based Research (DBR) methodological approach for the development of the STEM Education HUB, through iterative cycles of design, implementation, analysis, and redesign (see Figure 7).

Thus, the development of the STEM Education HUB should be guided by essential principles in DBR: the initial design must be supported by previous research and studies; the research must be conducted in real contexts; there should be close collaboration with participants; initial objectives and plans should be defined; data collection and analysis should be systematic and continuous; the design should be redefined continuously and iteratively; the bases that guide the design should be documented and disseminated, seeking to highlight the versatility and generalisation of the design¹².

¹² For more on DBR, see for example Amiel & Reeves (2008); Wang & Hannafin (2005), and Fraefel (2014).

Figure 7. Iterative cycles of design, implementation, analysis, and redesign in DBR



ADDIE Model

The ADDIE model is a popular framework for instructional design that guides the creation of effective training and learning materials. The term “ADDIE” results from the initials of analysis, design, development, implementation and evaluation. Although developed several years ago, the ADDIE model remains the most commonly used model for instructional design because it’s simple yet highly effective. The model follows a linear process and each phase of the model is made up of different procedural steps. For example, analysis typically includes needs analysis, learner analysis, context analysis, and content analysis. The output of the analysis phase is learning objectives, which serve as the input to the design phase (Sink, 2008).

ADDIE phases:

- **Analysis:** Learning problem, needs, constraints and goals are determined in analysis stage. Learners’ needs, current knowledge and their individual differences are analysed. In analysis stage of ADDIE model, goals are determined.
- **Design:** In this phase, teaching is planned utilising the outputs obtained from the analysis phase. Teaching strategies, materials, teaching steps and evaluations tools are determined.
- **Development:** Teaching is developed in parallel with the plan acquired in design phase. According to this plan, process evaluation tools are prepared, teaching materials, software, equipment and every sort of document are developed. Teaching environments are arranged.
- **Implementation:** Teaching prepared in development stage is effectively implemented. Every sort of strategy and material are applied which are developed in design stage.

- **Evaluation:** The last phase is the evaluation phase. This phase consists of two kinds of evaluations which are process and result evaluations. Process evaluation is implemented in all phases of the design during the process. Result evaluation is applied after implementation phase is implemented.

4.2. Training design

4.2.1. Analysis and target groups

The design of the STEM Education HUB demands a deep learning on the current situation of the involved universities, including studying women's individual needs at the university and key stakeholders mapping. After this analysis, both the target groups and the stakeholders in the countries involved should increase their knowledge about the current situation of female university students and their needs.

So, before the design of the training program, a preparatory phase is needed.

PREPARATORY PHASE:

A summary of the updated needs of university beneficiaries in sub-Saharan Africa and the creation of a stakeholder network should be one of the first actions.

The main objectives of this preparatory phase are to develop contextual assessment, conducting a comprehensive analysis of the specific needs and challenges related to gender gaps in STEM education in the target Sub-Saharan countries; and, stakeholders' engagement, involving relevant stakeholders, including students, university staff, educational institutions, researchers, etc., to ensure a collaborative and context-specific approach. To achieve the set goals, the following methodology should be implemented:

Data collection methods:

- Online surveys: to understand the current status of gender representation in STEM and identify specific challenges in each sub-Saharan country. Surveys conducted with female university students from the universities of Cape Verde and Ivory Coast.
- Online stakeholders' interviews: to gather stakeholders, including educators, researchers, policymakers, and industry representatives, on gender-related issues in STEM education.
- Online focus group discussions: to explore the experiences and perceptions through male and female groups interactions (students, researchers, teachers).
- Analysis of academic performance data: to identify gender disparities in academic performance (STEM programs enrolment and dropout rates by gender, academic outcomes, career prospects, the representation of women in STEM related occupations, distribution of academic roles among genders,

female participation as educators across various educational levels, and the extent of gender-based contributions in managerial and organizational positions within universities).

Data analysis plan:

Quantitative and qualitative analysis, validation and interpretation:

-Online Surveys:

- Analysis of enrolment data by gender to determine the current status of representation in STEM.
- Identification of the frequency and distribution of barriers faced by female students in pursuing STEM careers.

- Online interviews:

- Thematic analysis to categorize insights from each group.
- Identification of recurring themes.
- Identification of initiatives aimed at promoting gender inclusivity in STEM education.
- Analysis of previous case studies or programs implemented, to categorize best practices and lessons learned from the case studies.

-Online Discussion groups:

- Qualitative content analysis to explore and categorize challenges faced by female students in STEM courses.
- Extract and categorize ideas, focusing on potential strategies for creating a more inclusive STEM learning environment.

4.2.2. Design and development

The STEM Education Centre should offer a comprehensive programme of activities aimed at increasing women's participation in STEM careers. Participation in these activities should promote the development of the mentoring programme and, at the same time, depend on it for the effective participation of the target groups.

Thus, the design and development of the STEM Education HUB encompass different dimensions.

Dynamization and informative reference point

The STEM Education HUB should function as a dynamization and informative reference point. At a beginning phase is important to co-create tailored training modules for mentors to ensure they are equipped with the necessary skills and knowledge to effectively guide their mentees. Similarly, it should include training modules for mentees to help them to understand their role within the mentorship.

Development of educational resources to nurture the mentorship and training.

Developing didactic materials and educational resources to support STEM education involves creating tailored guides, learning modules, and practical activities suitable for different contexts.

These resources will be carefully co-created through a collaborative "thinking session" where stakeholders can jointly ideate, prototype and refine the resources. This participatory way of working will ensure the accessibility and relevance of the resources developed. Guides and modules will provide structured content, while hands-on activities will encourage practical engagement and application of STEM disciplines. This comprehensive approach aims to deliver dynamic and adaptable resources that teachers can effectively integrate into their teaching methodologies.

Creation of the STEM Education Hub in the partners' websites.

These local websites will ensure the accessibility of the resources created, namely by the translation of materials and activities. In these websites it should be outline the objectives, functionalities and structure of the STEM Education HUB. It should be ensured that they fit branding and user interface guidelines, and implement interactive features and tools, such as search functions, easy navigation, and resource download options. It is also important to incorporate feedback mechanisms for user participation and improvement.

ELEVATE-WISE School of Change: Train the Trainer

The STEM Education HUB should include the development of a comprehensive online course (MOOC) divided into modules, covering critical topics considering the information extracted from the needs analysis conducted previously. This course aims to ensure that mentors acquire the skills and knowledge necessary for impactful training.

Accessibility

The Quality and Ethics Manager will oversee the ethical and inclusiveness aspects of the STEM Education HUB, ensuring that participants represent as much as possible the general society, and the inclusion of vulnerable groups across the activities. Besides, for the different, co-design, validation and piloting activities planned, partners will offer participants the opportunity to participate from their own facilities, in case digital barriers make this necessary. The materials should be easily downloadable and usable through clear, simple, and straightforward instructions published on the websites. The project aims to provide open-source, user-friendly, and free technologies that are available to anybody with an internet connection. In this sense, the project attempts to get over barriers to inclusion such as geography and economics. Furthermore, the educational resources should have clear descriptions,

consider accessibility and inclusion in all aspects of the design and development process, including visual design, audio, language, and interaction design.

Micro-credentials

All courses and training activities should be launch in the form of micro-credentials, ensuring certification and recognition.

5. Timeline & Task Allocation

The design and development of the mentoring program and STEM Education HUB demand a strong involvement of all partners a clear definition of roles, if defined deadlines. Table 4 should be use to monitoring progress within each one of the intervention universities.

Table 4. Distribution of tasks among partners & Timeline

[illegible]

Design	Facilitate access to inspiring female role models in STEM areas	Promote meetings between female professionals and female students										
	Strengthening digital, scientific and leadership skills	Promote short courses in scientific and technological areas aimed at girls										
	Offer guidance and pedagogical support to girls who choose STEM fields	Group for monitoring and guiding girls' school progression in scientific and technological areas										
	Define the profile of the mentees	Target audience identification										
	Define the profile of the mentors	Definition of the profile of the mentors										
	Define the nature of the mentoring, timing, methodology and evaluation modality	Mentoring format (individual, group, face-to-face or online)										
		Duration										
		Content										
		Methodology										
		Evaluation										
Development	Implementing the training plan for mentors	Training of mentors in mentoring, communication and gender equity skills										
		Creation of guides/modules and mentoring support materials										
	Implementing the mentoring plan	Formal start of the program with launch ceremony										
		Session development according to plan										

	Supervision of the implementation	Continuous monitoring by a coordinating team										
		Collection of qualitative and quantitative data on the participants' experience										
Evaluation	Evaluate the impact of mentoring actions on the group	Satisfaction questionnaires, interviews and analysis of performance indicators										
		Preparation of final report										
Disclosure of results and redesign	Disseminate the result of the training and mentoring programs	Publication of results										
		Redesign of the experiences										
		Replication the experience										

6. Quality Assurance & Risk Management

ELEVATE-WISE project is committed to Responsible Research and Innovation (RRI) principles, embedding values at both beneficiary and project levels:

- **Inclusion:** Addressing topics related to ecological transition, with a special focus on socially vulnerable groups. NGOs and social services will actively participate, providing crucial feedback.
- **Reflection:** Encouraging critical reflection on lessons learned, assessing new practices, and fostering a collective brainstorming approach for practical applicability and transferability.
- **Responsiveness:** Forging close links between learning and innovation actions, responding to new knowledge, ethical concerns, and views expressed within and outside the governance structure. Public debates on ethical dilemmas will be promoted.

Service-Learning represents a methodology brimming with significant potential to foster a diverse array of values that contribute to sustainable human development. The project, aligned with prior studies examining the value landscape of this methodology, is grounded in the following framework of values:

- **Altruism and Cooperation:** denote the cultivation of behaviours diverging from individual interest logics, instead emphasizing mutual assistance, hospitality, and the essential interdependence among members of a collective.
- **Citizen participation and Solidarity:** entail encouraging students to actively participate as citizens in their community, empowering them to contribute to the common good. Additionally, promoting an exchange grounded in solidarity seeks to bring about mutual benefits: culturally, environmentally, and humanely.
- **Critical thinking and Transformative learning:** encompass instilling civic purpose into knowledge, making it a tool for enhancing reality and empowering students to reshape the world they inhabit. This process is guided by a critical, responsible, and respectful perspective.

The project methodology follows a participative and open discussion approach, focused on the consensus and agreement between all partners. The administrative, gender, ethics and quality issues will be continuously evaluated using an iterative assessment methodology, which allows continuous improvement of the project outputs and results.

Regarding the quality of the project management process, all partners agreed on a set of measures and methods for its assurance.

Measures for high-quality implementation:

- Partnership expertise: The partnership includes various experts owning the requisite know-how to ensure the quality and relevance of project outputs and results.
- Regular Communication and Coordination: clear communication channels and regular meetings to review progress, address challenges, and make necessary adjustments.
- Continuous Quality Assessment: Mechanisms will be implemented to continuously assess quality throughout the design and implementation of the STEAM Education HUB, ensuring ongoing improvement and adherence to standards, and a risk management and control.

Methods for Quality Assurance, Monitoring, Planning, and Control:

An important issue for ensuring the high-quality implementation of the project is the internal coordination and relations among partners within the consortium and, also, the external relations and networking, in particular, with stakeholders and with potentially related EU-funded projects.

Virtual and face-to-face meetings (see WP1: T1.10 and T1.11 and the timeline) are foreseen and planned to monitor the main and essential features. In addition, bilateral meetings between the project coordinator and any other partner could be organised to address themes or issues in a timely manner.

Additionally, stakeholders who already expressed their interest in the project and its concept, will receive news and will be contacted regularly.

As regards the quality of the results but also ethics, privacy issues and values (inclusion reflection, and responsiveness), these will be the responsibility of UNICV as Quality and Ethics Manager and of UBU as Project Coordinator, although all partners should be involved and committed to these issues. UNICV will work to ensure in advance identification and mitigation of technical, social and project risks.

Evaluation Methods and Indicators

The evaluation of the accomplishment of results will be measured in-line with the strategies draft above, The Project Coordinator with the Quality and Ethics Manager should define the measures to be quantified and the means for assessing them from a qualitative and quantitative point of view.

The following SMART (Specific, Measurable, Achievable, Relevant and Time-bound) indicators are considered to measure the achievement and quality of results.

Quantitative:

- Number of participants involved in co-design activities;
- Profile of participants involved in co-design activities;
- Number of participants involved in evaluation activities;

- Profiles of participants involved in evaluation activities;
- Number of women trained in the MOOC course;
- Number of downloads from the Hub of the training programme.

Qualitative:

- Completeness: The approach addresses a variety of topics, including lessons learnt, best practices, active learning methodologies, materials to assist mentors in gaining competences and incorporating them, STEM topics related to real applications related to the degree, etc. (consultation among experts).
- Transferability: The resources developed are usable and adaptable to different countries and education systems (consultation experts).
- Perceived improvement in students' STEM competences (consultation with target group and key stakeholders).
- Perceived improvement in students' interest and confidence in STEM disciplines (consultation with target group and key stakeholders).
- Increased awareness of social and cultural stereotypes around STEM and gender among female university and school students, university professors, families and stakeholders (ad hoc tools for data collection).

Through this holistic approach, ELEVATE-WISE project seeks to empower girls, not only academically but also by instilling a sense of social responsibility and innovation.

Table 5. Critical risks and risk management strategy

Risk No	Description	Proposed risk-mitigation measures
R1	Trained participants do not understand the resources and materials provided to them.	Careful preparation of resources and materials by people with experience in the sub-Saharan region, using qualified professionals in their field. Reappropriation of materials at points identified as critical in evaluations. Suitable measures will also be considered to ensure the accessibility and inclusiveness of the project resources, and in the specific case of the Hub and the Website, the Web Content Accessibility Guidelines (WCAG) 2.1 published in 2018 by the World Wide Web Consortium (W3C) will be followed.
R2	Inadequate participation in cocreation and validation activities.	Develop tailored outreach and communication and dissemination strategies to encourage active participation in these tasks. Prepare a comprehensive recruitment protocol and consultation with external experts if necessary

R3	Resistance to change in professors to integrate didactic materials in their classrooms	Implement a comprehensive university professors engagement strategy, including regular communication to foster understanding and collaboration.
R4	Some project tasks cannot be completed due to unforeseen delays or circumstances outside of the project's control.	Guidance of the WP leaders to find solutions and mid-term activities/projects to assess the project and contemplate alternative actions.
R5	Delay in completing milestones on the targeted dates.	Constant monitoring of the programme, reminders of deadlines and early warnings for the fulfilment of tasks.

7. Conclusion

ELEVATE-WISE aims to increase female students' interest in STEM careers and their prospects of accessing these demanding niche markets, while helping them to reduce their drop-out rate in these fields of education. This will be achieved by adopting a practical and active methodology that enables them to solve real problems, in particular the challenges they face in Ivory Coast and Cape Verde. By implementing innovative initiatives, the project will contribute to improving students' interest and self-esteem in STEM disciplines, with an impact also on female students who are still of school age.

ELEVATE-WISE will provide a mentoring model for girls that functions as a STEM Education HUB, offering a comprehensive program of activities before and during university studies. The expected benefits of the project for the target groups are:

- Increased self-confidence among female students in both higher education institutions and schools; by providing them with hands-on experience, exposure to practical problem-solving, role models and opportunities to apply STEM concepts in real-world scenarios, the project aims to build a solid foundation of self-confidence.
- Enhanced STEM skills and competencies through engagement in real-world problem-solving activities. With the incorporation of service-learning programs, female students will gain valuable skills that are directly applicable to their chosen STEM disciplines.
- Increased exposure to successful female role models and mentors. The project aims to broaden the horizons and opportunities of the target groups by sharing inspiring stories of women who have excelled in STEM careers, while acting as role models for girls in schools themselves.
- Changing the target groups' perceptions of STEM. By addressing the social and cultural factors that may discourage female students from pursuing STEM careers, the project aims to reshape the narrative around gender stereotypes in these fields.
- Increased access to inclusive educational resources, exposure to cutting-edge training materials and participation in international collaborations will lead to positive changes in their academic and career pursuits. By broadening the opportunities available to the targeted groups, the project aims to equip them with the tools and networks needed to succeed in their academic journey and future STEM careers.

It should be noted that the expected outcomes depend on the availability of mentors and educators willing to participate in the program, on the access that educators have to appropriate training resources and support, on the collaboration and input from experienced professors and female students

in the development, and on effective communication strategies to ensure the engagement of target audiences and the dissemination of resources and activities.

It is expected that the project will have an impact on more than 700 university teachers and staff and at least 2,000 female students enrolled in higher education institutions. With this the project intends to:

- Increase in the number of female university students enrolled in STEM careers (beneficiary universities in Ivory Coast and Cape Verde).
- Decrease in the number of female university dropouts from STEM careers in beneficiary universities in Ivory Coast and Cape Verde).
- Reducing the gender gap in STEM-related jobs in all partnership countries.

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