unite! | University Network for Innovation, Technology and Engineering

Unite! Researcher Development Framework

Unite! Community 6 - Professional development & Training
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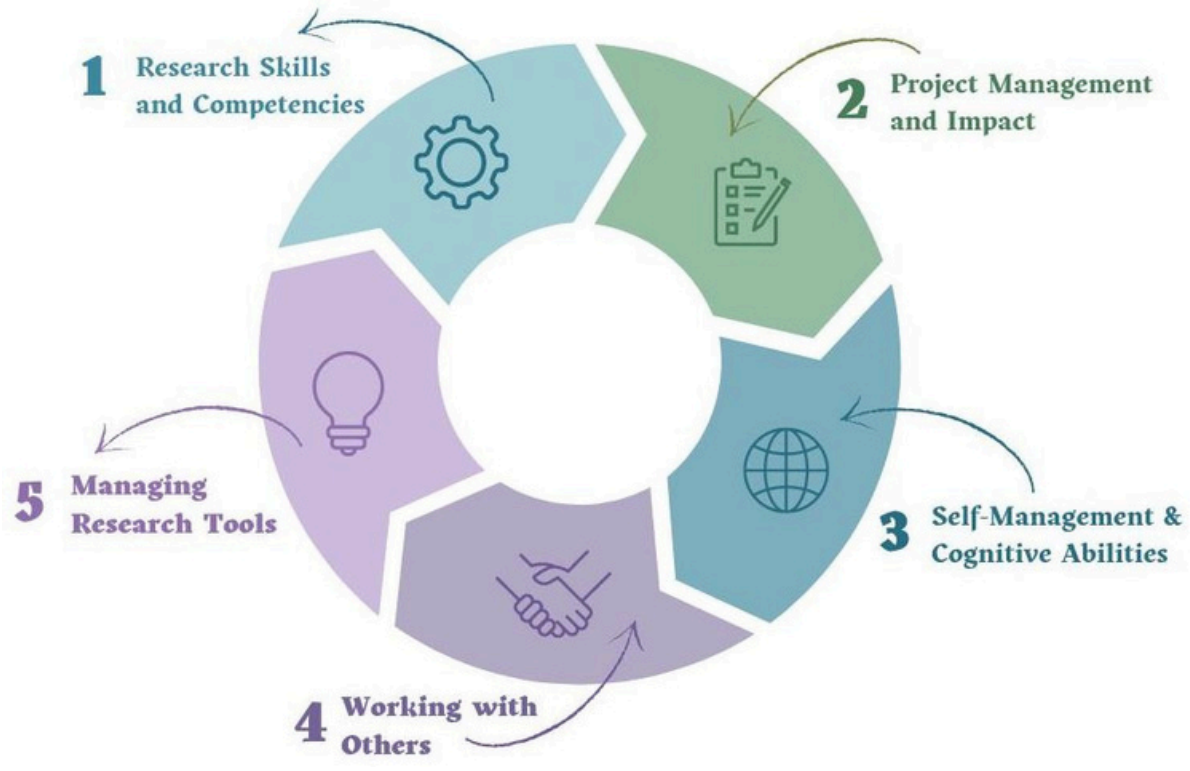
Introduction

Research is a dynamic and evolving field, and researchers need to continually develop their skills, knowledge, and expertise to thrive in their careers. The Unite! Researchers Development Framework (URDF) guide is designed to assist researchers in planning and achieving their professional development goals. The URDF is a versatile tool that can be customized to fit the specific individual needs of researchers. This document draws inspiration and refers in parts to the Cambridge Researcher Development Framework and the ResearchComp (European Competence Framework for Researchers), adapting their principles to create a comprehensive and flexible guide for researchers' career development.

This Framework is developed within the UNITE! Alliance, aiming to respond to Community 6 challenge to develop a common Training Programme for Postdocs and Young Researchers. The rationale for the framework development was to establish a simple but yet meaningful set of competences to which the alliance can contribute with already existing, or to be developed, trainings, assuring the young researchers professional and personal development.

The RDF offers a Unite! Development Needs Analysis (UDNA) tool to assist in identifying skills for training and development, with a focus on postdoctoral researchers and junior research staff. The framework divides skill development into four elementary skill categories: foundational, intermediate, advanced, and expert areas:



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Objectives Foster research excellence. Enhance research-related skills and competencies. Prepare researchers for diverse career paths. Promote research ethics and integrity. Support diversity and inclusion.

Aim

This Unite! Researcher Development Framework is designed to guide researchers at different stages of their careers, from Recognized researchers (R2) to Leading researchers (R4). It focuses on the acquisition of skills, abilities, and knowledge needed for excellence in research, impact, self-management, cognitive development, working effectively with others, and managing research.

Objectives

- Foster research excellence.
- Enhance research-related skills and competencies.
- Prepare researchers for diverse career paths.
- Promote research ethics and integrity. Support diversity and inclusion.

Target Audience

Recognized researchers (R2) to Leading researchers (R4) Postdoctoral researchers.

Getting started

To aid researchers identifying the skills they need to develop we recommend each professional to use the Unite! Development Needs Analysis (UDNA) tool based on the Vitae Researcher Development Framework.[1]

Just as everyone's research is unique, so are their development needs. The Unite! Development Needs Analysis (UDNA) will help researchers to identify the requirements and plan their training and development activities. Under the guidance of their supervisors, researchers are advised to undertake a development needs analysis in the early beginning of their career and then review and update it at least once a year.

Accessing resources & development opportunities

The training programmes and development opportunities are available at https://facultyandstaff.unite-university.eu/ and are organized according the URDF, so that researchers can easily identify the available trainings to address their needs.

[1] The UDNA form uses Vitae's Researcher Development Framework (RDF) to help researchers think about their current skills, pinpoint gaps in their knowledge, and identify areas for future development. The RDF articulates the knowledge, behaviours and attitudes of researchers, from postgraduates to established academic leaders and is endorsed by Research Councils UK. It is important to repeat the process of discussing the researchers' skills with his/her supervisor each year to get a fresh picture of the skills development needs.

There will be 2 sets of trainings:

• Unite! Partners University Trainings: these are trainings organized by each Unite! Partner, that are open to all Unite! Community. Under these circumstances trainees must follow the registration, attendance, and assessment rules of the partner holding the training.

• Unite! Alliance Trainings: these are trainings that might be developed under the Alliance. Under these circumstances trainees must follow the registration, attendance, and assessment rules defined by the consortium and that might vary according to each training typology.

Unite! Researcher Development Framework (URDF)

Progression within each skill area is categorized into foundational, intermediate, advanced, and expert levels, reflecting the increasing proficiency and impact a researcher can achieve throughout their career.

This comprehensive framework aims to provide researchers with a clear path for skill development and career progression, regardless of their career stage, and emphasizes the importance of research excellence, impact, self-management, cognitive development, working effectively with others, and managing research tools highlighting the dynamic nature of skill progression within the constantly changing field of research and acts as a guide for researchers at every career stage by classifying the developmental levels into foundational, intermediate, advanced, and expert categories. The deliberate alignment with these particular skill areas guarantees that researchers have a broad skill set that not only meets the requirements of their field but also equips them for a variety of roles and responsibilities within the research ecosystem.

In essence, this structure serves as a beacon for researchers, illuminating a clear andadaptable pathway that transcends career stages. It not only addresses the immediate needs of skill development but also underscores the enduring importance of research excellence, societal impact, personal and professional growth, effective collaboration, and adept management of research tools as researchers navigate the intricate terrain of their careers.

1 Research Skills & Competencies

The development of essential skills and core competencies required to excel as a researcher. It encompasses various aspects of research, including methodology, interdisciplinary knowledge, ethical considerations, and the effective communication of research findings. Researchers at all levels, from novices to experts, continually enhance their research skills to stay at the forefront of their fields.

1.1. Research Methods and Techniques:

Researchers begin by understanding specific research methods, from data collection to analysis. As they progress, they apply these methods and introduce new tools, eventually coordinating research collaborations and leading large research organizations.

1. Foundational level: Understanding specific research methods.
1.1. Intermediate level: Application of research methods and introduction of new tools.
1.1.1. Advanced level: Coordination of research collaboration networks.
1.1.1.1. Expert level: Setting the research agenda and leading large research organisations.

1.2. Broader Disciplinary Knowledge:

Acquire a foundational understanding of key concepts within their research area. They transition to making contributions to their field while adhering to ethical requisites. Ultimately, they reach a level where they influence societal aspects, contributing to cross-disciplinary knowledge at a national and international scale.

1. Foundational level: Understanding key concepts in a research area.
1.1. Intermediate level: Contribution to the field and ethical requisites.
1.1.1. Advanced level: Making original contributions and influencing societal aspects.
1.1.1.1. Expert level: Influencing national and international policies and contributing to cross-disciplinary knowledge.

1.3. Ethical and Legal Requirements:

Ethical principles are crucial for the research community. Researchers start by grasping these principles and then apply ethical conduct and address misconduct when necessary. At an advanced stage, they promote ethical guidelines and awareness, advising policymakers on research ethics and integrity policies.

1. Foundational level: Understanding ethical principles.
1.1. Intermediate level: Applying ethical conduct and addressing misconduct.
1.1.1. Advanced level: Promoting ethical guidelines and awareness.
1.1.1.1. Expert level: Advising policymakers on research ethics and integrity policies.

2. Project Management and Impact

Researchers learn to efficiently manage research projects, including resource allocation, timelines, and budgets. Additionally, they explore how to make a significant impact with their research, persuading audiences about its importance, influencing change in research fields, and shaping research policies. The ability to manage projects and create a notable impact is vital for research success.

2.1. Leadership and Project Management:

In the contemporary dynamics of research, collaborative leadership becomes a key competence. Researchers working in multidisciplinary settings must collaborate and use synergy to overcome complex challenges. This approach surpasses conventional hierarchies by fostering an ongoing interchange of concepts and expertise. Thus, the capacity for collaborative leadership becomes significant in encouraging innovation and quality in the search for knowledge, solidifying its role as a catalyst for the progress of scientific inquiry.

Researchers commence with managing their personal research projects. Progressing to the intermediate level, they handle multiple projects while optimizing resources, timelines, and budgets. At an advanced stage, they develop expertise in teamwork and leadership for the team's benefit. Eventually, they become experts in leading successful teams and enhancing organizational capacity.

1. Foundational level: Understanding the significance of collaborative leadership in multidisciplinary research settings | Managing personal research projects.
1.1. Intermediate level: Actively participating in teamwork and applying synergy to tackle difficult problems | Managing multiple projects, including resources, timelines, and budgets.
1.1.1. Advanced level: Demonstrating proficiency in fostering an ongoing interchange of concepts and expertise within collaborative teams | Optimizing teamwork, leadership for the team's benefit.
1.1.1.1. Expert level: leading team projects and using leadership abilities to encourage innovation and quality in scientific research, thereby acting as a spur for advancement in the area | Developing effective teams and strengthening organizational capability.

2.2. Research Impact:

Building research impact begins with convincing audiences about the importance of one's work. At the intermediate level, researchers influence change within their research fields and beyond. As they advance further, they shape research policies and agendas. At the expert level, they become thought leaders, shaping the broader research agenda with their work.

1. Foundational level: Convincing audiences about research importance.
1.1. Intermediate level: Influencing change in research fields and beyond.
1.1.1. Advanced level: Shaping research policies and agenda.
1.1.1.1. Expert level: Thought leader shaping the broader research agenda.

2.3. Open Access and Innovation:

Understanding the value of open access and innovation is the starting point. Researchers then progress to promoting open access and creating innovative solutions. In the advanced stage, they lead open-source projects and influence open-source policies. At the expert level, they become authorities in driving transformative change through open access and innovation.

1. Foundational level: Understanding the value of open access and innovation.
1.1. Intermediate level: Promoting open access, creating innovative solutions.
1.1.1. Advanced level: Leading open-source projects and influencing open-source policies.
1.1.1.1. Expert level: Authority in driving transformative change through open access and innovation.

2.4. Pedagogical Prowess:

A well-rounded researcher in academia requires the smooth integration of teaching and research. The variety of teaching styles found in university settings, along with the increasing responsibility that comes with either academic or professional settings, highlight the flexibility and changing roles that researchers play. It is acknowledged that teaching is a dynamic force that shapes the intersection of research and education, in addition to being a skill that belongs in a researcher's portfolio. This synthesis makes a significant contribution to the integration of research and education in academia by offering a foundation for investigating the pathways taken by researchers as they advance from foundational instructional roles to leadership positions.

1. Foundational level: Researchers establish adaptability in teaching diverse environments, recognizing teaching as a fundamental skill in their portfolio.
1.1. Intermediate level: They expand roles within academic or vocational contexts, contributing to undergraduate education, developing unique teaching styles, and co-supervising projects.
1.1.1. Advanced level: Researchers take leadership in educational programs, managing initiatives, advocating for the teaching-research connection, and refining teaching methods.

1.1.1.1. Expert level: At the pinnacle, researchers are recognized as inspiring educators, leading programs, and shaping the broader educational landscape with their research insights.

2.5. Engaging with the Broad Public:

In the realm of research, effective presentation and communication of findings are paramount for impactful engagement across diverse audiences. Researchers have a further responsibility to persuade different stakeholders—such as experts, decision-makers, and the general public—of the importance of their work. It's critical to have the flexibility to modify one's communication style for various contexts, including meetings, online forums, and lecture halls. Furthermore, the significance of modifying scientific communication for the general audience is underscored, advancing from a basic comprehension to expert-level strategic assistance and well-known communication proficiency. With a particular focus on public engagement through initiatives like the Engaged Researcher program, developmental opportunities, such as workshops and online resources, are available to support researchers on this journey.

1. Foundational level: Researchers grasp the basics of effective communication. They understand the importance of tailoring their message for different audiences and settings, emphasizing clarity and persuasion.
1.1. Intermediate level: In the middle stage, researchers broaden their communication roles, contributing to undergraduate education, developing unique styles, and getting involved in project supervision.
1.1.1. Advanced level: As expertise grows, researchers take leadership in communication strategies. They manage initiatives to promote public understanding advocate for the teaching-research connection and refine methods for diverse audiences.
1.1.1.1. Expert level: At the highest level, researchers become influential communicators. They lead major public engagement projects, shape public perception of their field, and are renowned for conveying complex ideas clearly and engagingly. This includes strategic support for campaigns and occupying specific roles or chairs dedicated to public engagement.

3. Self-Management & Cognitive Abilities

Self-management involves developing the skills necessary to effectively manage one's personal and professional life. Researchers at various career stages enhance their self-awareness, time management, coping strategies for dealing with challenges, and their ability to balance work with personal well-being. This category empowers researchers to lead balanced and fulfilling research careers.

Cognitive abilities refer to the intellectual capacities that researchers cultivate to drive their research forward. These include abstract thinking, critical thinking, analytical thinking, thinking, systemic thinking, problem-solving, and creativity. Researchers progressively refine these cognitive skills as they advance in their careers and contribute to the expansion of knowledge.

3.1. Personal Professional Development:

Beginning with active mentoring and record-keeping of achievements, researchers progress to developing skills for personal and career-oriented growth. They engage in coaching, networking for professional development, and, at an advanced stage, strategically develop skills and support others' development, paving the way for successors. At the expert level, they are known as reference points for lifelong learning and continuous professional development.

1. Foundational level: Active seeking of mentoring and record-keeping of achievements.
1.1. Intermediate level: Developing personal and career-oriented skills, coaching, and networking for professional development.
1.1.1. Advanced level: Strategical developing skills, supporting others' development, and paving the way for successors.
1.1.1.1. Expert level: Known as a reference point for lifelong learning and continuous professional development.

3.2. Mastering Stressful Situations:

Researchers learn to handle unfamiliar situations with limited support at the foundational level. They persevere and adapt in stressful situations at the intermediate stage. In the advanced phase, they develop strategies for dealing with adversity, and experts are known for confident decision-making in uncertain and adverse situations.

1. Foundational level: Handling unfamiliar situations with limited support.
1.1. Intermediate level: Persevering and adapting in stressful situations.
1.1.1. Advanced level: Developing strategies for dealing with adversity.
1.1.1.1. Expert level: Known for confident decision-making in uncertain and adverse situations.

3.3. Thinking Skills:

Researchers begin by assimilating concepts from their own discipline at the foundational level. They progress to using concepts from other disciplines, providing valuable insights.
In the advanced stage, they elaborate on complex trends and patterns, connecting unrelated ideas. At the expert level, they contribute outstanding insights, pushing the frontiers of knowledge.
1. Foundational level: Assimilating concepts from own discipline.
1.1. Intermediate level: Using concepts from other disciplines, providing insights.
1.1.1. Advanced level: Elaborating complex trends and patterns, connecting unrelated ideas.
1.1.1.1. Expert level: Contributing outstanding insights pushing the frontiers of knowledge.

4. Working with Others 

Effective collaboration and teamwork are essential for successful research. This category emphasizes the development of professional and interpersonal skills, the building of networks, teamwork dynamics, mentorship, well-being at work, and the promotion of inclusion and diversity.

EResearchers learn how to work harmoniously with colleagues, support and mentor others, and create a positive and diverse research environment.

4.1. Professional Interaction and Languages:

Interaction is fundamental in the field of research because researchers are first and foremost open to a diversity of perspectives. As they advance in their careers, they are diligently seeking input from peers and broaden their scope of collaboration beyond small groups. Cross-disciplinary and cross-border interdisciplinary collaboration becomes critical in an advanced phase. This collaborative mindset emphasizes leadership in team supervision as well. In this situation, leadership transcends specialization and embraces teamwork with a variety of specialists and groups. Here, "managing your immediate team" means proactively forming alliances and interacting with other research groups, as well as identifying and honoring specialists for their comprehensive contributions to the field's advancement. This methodology fosters a comprehensive and receptive outlook, acknowledging the significance of varied perspectives in the quest for scientific progress.

A researcher's prowess is greatly enhanced by proficiency in foreign languages. The journey commences with the acquisition of fundamental knowledge in one or more languages, strategically chosen for their relevance to research endeavors. Progressing through the stages, researchers attain a state of multilingual proficiency, unlocking the potential for innovative research and fostering collaborative efforts through their adept language skills. This linguistic versatility not only broadens the scope of exploration but also facilitates effective communication and engagement with a diverse global academic community.

1. Foundational level: Listening to others' ideas without prejudice | Knowing a foreign language to help research.
1.1. Intermediate level: Collaborating professionally, seeking feedback from colleagues | Advanced proficiency in one or more languages.
1.1.1. Advanced level: Engaging with colleagues across disciplines, including staff supervision | Multilingual proficiency for research and future career opportunities.

1.1.1.1. Expert level: Recognized for effective leadership style when approaching others outside their research group | Leveraging language skills for innovative research and collaborations.

4.2. Network Development:

Understanding the value of collaborative work is the foundation. Researchers then build working relationships, promote collaboration, and make themselves accessible at the intermediate level. In the advanced stage, they engage in cross-disciplinary teams and use networking environments for profile promotion. Experts lead collaboration partnerships at national and international levels.

1. Foundational level: Recognizing the value of teamwork in both personal and professional contexts, such as incorporating knowledge and science from other fields.
1.1. Intermediate level: Establishing professional connections, encouraging teamwork, and being approachable.
1.1.1. Advanced level: Participating in interdisciplinary teams and promoting one's profile through networking settings.
1.1.1.1. Expert level: Managing national and international cooperative partnerships.

4.3. Mentorship:

Supporting others and acknowledging the importance of mentoring is foundational. Researchers at the intermediate level encourage colleagues to seek guidance and act as mentors. In the advanced stage, they develop mentoring protocols, nurture talents, and contribute to researchers' development. Experts are known for building resilient researchers and influencing mentor-mentee policies.

1. Foundational level: Supporting others and acknowledging the importance of mentoring.
1.1. Intermediate level: Encouraging colleagues to seek guidance and acting as a mentor.
1.1.1. Advanced level: Developing mentoring procedures, fostering abilities, and assisting in the professional growth of researchers.

1.1.1.1. Expert level: Considered for strengthening researchers' resilience and influencing mentor-mentee agreements.

4.4. Diversity and Multicultural Environments:

Handling multiculturalism encompasses not only geographical diversity but also variances in culture, religion, and gender. An inclusive research environment must be built on tolerance and respect for these differences. It is essential to cultivate cultural intelligence by appreciating and comprehending different points of view. This ability offers businesses a competitive edge in addition to enhancing the educational experience. Encouraging cultural diversity fosters innovation, equips researchers for global challenges, and develops inclusive and intercultural leaders.

5. Managing Research Tools 

Researchers must efficiently handle research tools and data in the digital and data-driven research environment of today. This category covers topics including the usage of open- source software, citizen science participation, intellectual property rights, and research data management. Researchers becoming increasingly adept at using data and technology to do meaningful study.

5.1. Data Management and Programming Languages:

The first step for researchers is to locate reliable data sources. They visibly handle, organize, and verify data at the intermediate level. They use metrics, data management concepts, and data analysis tools in the advanced level. Experts use data to generate new knowledge, influencing data initiatives and policy.

The first step for researchers is to locate reliable data sources. They visibly handle, organize, and verify data at the intermediate level. They use metrics, data management concepts, and data analysis tools in the advanced level. Experts use data to generate new knowledge, influencing data initiatives and policy.

Additionally, knowledge of one or more programming languages can greatly extend perspectives and be essential for conducting research and determining the course of your future profession. Proficiency in at least one programming language is seen as necessary in scientific domains, providing access to improved research capacities and professional prospects. Managing Open-Source software extends beyond the domain of licensed software and requires a thorough comprehension of the main Open-Source models, licensing models, and common coding practices used in software development.

1. Foundational level: Identifying trustworthy data sources | Understanding the basics of one or more programming languages, including their syntax and fundamental concepts.
1.1. Intermediate level: Organizing, validating, and managing data transparently | Effectively using programming languages to conduct research, manipulate data, and implement coding practices. Proficiency in organizing and structuring code transparently.
1.1.1. Advanced level: Applying data analysis tools, data management principles, and metrics | Applying advanced programming techniques, leveraging data analysis tools, and incorporating programming metrics for enhanced efficiency in research and problem-solving.
1.1.1.1. Expert level: Shaping data initiatives and policies and using data to create new knowledge | Influencing and shaping programming initiatives and policies, contributing to the development of new programming paradigms, and utilizing programming languages to create innovative solutions and methodologies.

5.2. Intellectual Property and Innovation:

It is fundamental to comprehend fundamental data ownership guidelines. Researchers are conversant with licenses, access, and research output protection at the intermediate level. They offer peers intellectual property advice when they are in the advanced stages. Experts have an impact on intellectual property laws by safeguarding and marketing research results.

1. Foundational level: Understanding basic data ownership rules.
1.1. Intermediate level: Familiar with protection of research outputs, licenses, and access.
1.1.1. Advanced level: Advises peers on intellectual property.
1.1.1.1. Expert level: Protects and commercialises research outputs, influencing IP policies.

5.3. Citizen Science:

One of the initial objectives for researchers is to comprehend the possibilities of including citizens in their work. They interact with and incorporate citizens into research at the intermediate level. They create advanced-level protocols for including citizens in research. Professionals oversee the creation of procedures and successfully involve the public.

1. Foundational level: Understanding the potential of engaging citizens in research.
1.1. Intermediate level: Engages with and integrates citizens into research.
1.1.1. Advanced level: Develops protocols for citizen inclusion in research.
1.1.1.1. Expert level: Leads the development of protocols and engages citizens effectively.