FINAL REPORT

INTRODUCTION TO SCIENTIFIC COMMUNICATION AND GRANT WRITING

Submitted To:

EAST AFRICAN SCIENCE & TECHNOLOGY COMMISSION (EASTECO)

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Definitions

- **Blended Learning**: A pedagogical approach that combines online educational materials and interactive online activities with traditional face-to-face classroom methods. It allows flexibility in time and space for both teaching and learning, enhancing accessibility and engagement through diverse learning modes.

- **Asynchronous Learning**: A method of education that allows students to access and engage with course content at their convenience without real-time interaction. This mode supports varied learning paces and schedules, facilitating continuous education outside of scheduled sessions.

- **Synchronous Learning**: Real-time, interactive learning that takes place at scheduled times and often includes live online lectures, discussions, and collaborations. This format aims to replicate the dynamic of traditional classroom settings virtually.

- **Moodle LMS (Learning Management System)**: An open-source platform used for creating, managing, and deploying educational courses and training programs online. Moodle LMS supports both asynchronous and synchronous learning and is designed to enhance the educational experience by providing a structured environment for content, communication, and assessment.

- **Grant Writing**: The practice of formulating and submitting proposals aimed at securing financial grants from institutions like government agencies, corporations, foundations, or trusts. Effective grant writing involves clearly stating the need, objectives, and expected outcomes of the project, along with a detailed budget and plan for achieving the proposed goals.

- **Scientific Communication**: The practice of conveying and discussing research findings within the scientific community and to the wider public. It involves presenting data and theories effectively, often through various forms of scientific writing such as articles, reports, and presentations, to foster understanding and advancement in a particular field.

- **Participant Assessments**: Evaluative processes designed to measure the learning, comprehension, and application of knowledge by participants in an educational program. These assessments can take various forms, such as quizzes, assignments, and practical exercises, providing feedback and metrics on participant progress.

- **EAC Vision 2050**: A long-term strategy aimed at transforming the East African region into a cohesive, economically stable, and competitively sustainable community. This vision focuses on deepening integration and promoting socio-economic development to enhance the quality of life for its citizens.

- **Peer Review**: An evaluative process in which scholars or experts in a similar field critically assess the work of their peers, such as academic papers or research proposals. This rigorous review ensures the validity, reliability, and originality of the work before it is published or funded, maintaining the integrity of scholarly communication.

Acronyms

- **EAC**: East African Community
- **EASTECO**: East African Science and Technology Commission
- **LMS**: Learning Management System
- **STI**: Science, Technology, and Innovation

Section 1: Introduction

1.1 Executive Summary

This report presents the outcomes of a blended course designed to enhance skills in scientific communication and grant writing among participants from East African Community (EAC) countries. The course was implemented over 10 days, combining online sessions and asynchronous learning activities on Moodle, and included structured assessments to ensure mastery. The initiative aimed to strengthen the capacity of East African researchers to effectively convey scientific findings and secure research funding, in line with EASTECO's commitment to fostering regional scientific and technological development. Pre and post-test assessments showed notable improvements, with scientific communication scores increasing by 16.9%. The course successfully met its objectives of developing participants' abilities in conveying research findings and crafting compelling grant proposals, contributing to EASTECO's mission of fostering scientific excellence in the East African region.

1.2 Background of the Consultancy Assignment

The East African Community (EAC) is a regional inter-governmental organization consisting of the Democratic Republic of Congo, Republics of Burundi, Kenya, Rwanda, South Sudan, Uganda, and the United Republic of Tanzania. It aims to enhance cooperation among Partner States across various sectors such as political, economic, social, cultural, research, technology, defense, security, and legal affairs, for mutual benefit. The Treaty for the Establishment of the East African Community highlights the critical role of science and technology in economic development, with Chapter 16, Article 103, emphasizing the promotion of cooperation in science and technology development and application. Additionally, Article 80 focuses on industrial development.

The East African Science and Technology Commission (EASTECO), established under its Protocol, is tasked with coordinating and promoting science and technology to support regional integration and socio-economic development. EASTECO's specific objectives include promoting new and emerging technologies, fostering innovation, and identifying and nurturing special talents in science and technology, particularly among youth and with an emphasis on gender parity.

In line with these goals, EASTECO has contracted Prof. **Jeanine Condo** to design and deliver a course titled **"Introduction to Scientific Communication and Grant Writing."** This course is tailored to enhance the capacities of students and professionals from the EAC countries by equipping them with essential skills for effective scientific communication and grant writing. The training potentially enabled participants to clearly and persuasively communicate research findings and prepare successful funding proposals for research and development projects. This initiative is part of EASTECO's commitment to fostering a knowledge-driven society in the EAC region and enhancing regional growth, innovation, and scientific collaboration.

1.3 Rationale

The increasing integration of science, technology, and innovation (STI) within global economies is transforming how knowledge is generated, disseminated, and utilized. In East Africa, leveraging scientific research and technological breakthroughs is crucial for driving sustainable socio-economic development, enhancing regional competitiveness, and spurring innovation across diverse sectors. The region's pursuit to close the scientific capacity gap is underscored by the need to effectively communicate scientific findings and secure essential funding to propel research and development efforts.

The **"Introduction to Scientific Communication and Grant Writing"** course is meticulously designed to mitigate these challenges by arming students and professionals with the requisite skills to convey complex scientific concepts to a broad audience, including policymakers, funding bodies, and the general public. Mastery of scientific communication, through both written and oral presentations, is pivotal in transforming research results into practical solutions that can shape policies, enhance public health, and drive technological progress. Effective communication also plays a crucial role in making scientific knowledge accessible, pertinent, and impactful, thereby addressing real-world challenges.

Furthermore, proficiency in grant writing is increasingly vital for researchers and institutions that seek financial backing for their initiatives. In a competitive funding environment, the ability to proficiently draft grant proposals is essential. This skill enables professionals to succinctly state their research goals, suggest innovative approaches to urgent issues, and highlight the broader societal and economic benefits of their proposals. Securing funding is vital for sustaining and expanding scientific research within East Africa, enabling researchers to significantly contribute to the achievement of national and regional development objectives.

The rationale for this course stems from the acknowledgment that the East African Partner States need to establish a comprehensive scientific communication framework to fully leverage STI for regional integration and socio-economic advancement. By providing this training, EASTECO seeks to bolster the capabilities of researchers and professionals from Kenya, Rwanda, Uganda, Tanzania, Burundi, the Democratic Republic of Congo, and South Sudan. The course aimed to refine their skills in articulating scientific achievements and securing funding through meticulously crafted grant proposals. This empowerment facilitates the execution of national and regional development strategies, including the EAC Vision 2050. It is designed to promote scientific excellence, stimulate innovation, and support sustainable development initiatives across East Africa, thereby fostering a robust, knowledge-driven economic landscape.

Section 2: Objectives and Scope

The primary objectives of the course were:

1. To develop the scientific communication skills of participants, enabling them to convey research findings clearly and effectively to a variety of audiences, including funding bodies, policymakers, and the public.
2. To equip participants with practical grant writing skills, improving their ability to draft compelling proposals that increase their chances of securing research funding.
3. To foster a collaborative environment where participants could engage with mentors, share insights, and receive feedback on their scientific and grant writing skills.

Section 3. Methodology and Course Delivery

The course was designed using a blended learning model, incorporating a flipped classroom approach with online sessions and asynchronous activities in the Moodle Learning Management System(LMS). This setup allowed for a balance between self-paced study and live, interactive sessions, accommodating participants from diverse locations across East Africa.

3.1. Pre-Course Preparations

Prior to the start of the course, each participant received:

- **Platform Access:** A total of 2,555 participants received login credentials for the platform before the training began.
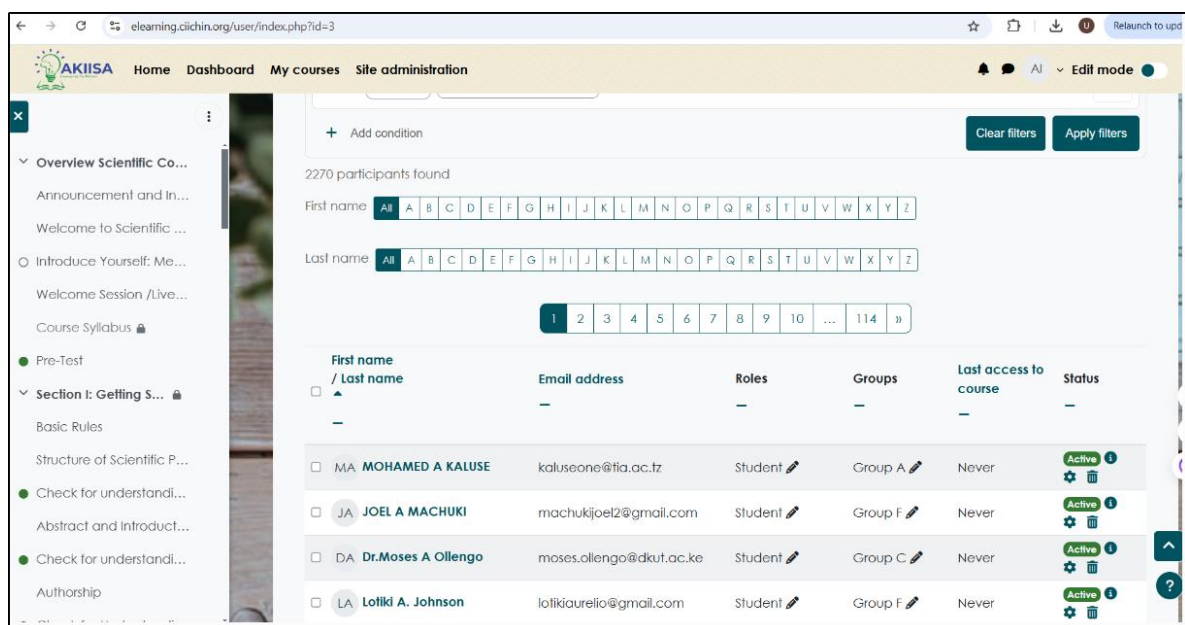

Figure 1: Number of participants enrolled

- **Orientation Materials:** A comprehensive guide on course structure, learning objectives, and assessment criteria.

- **Technical Guide:** Step-by-step instructions for navigating the Moodle LMS, accessing live sessions,

and submitting assignments.
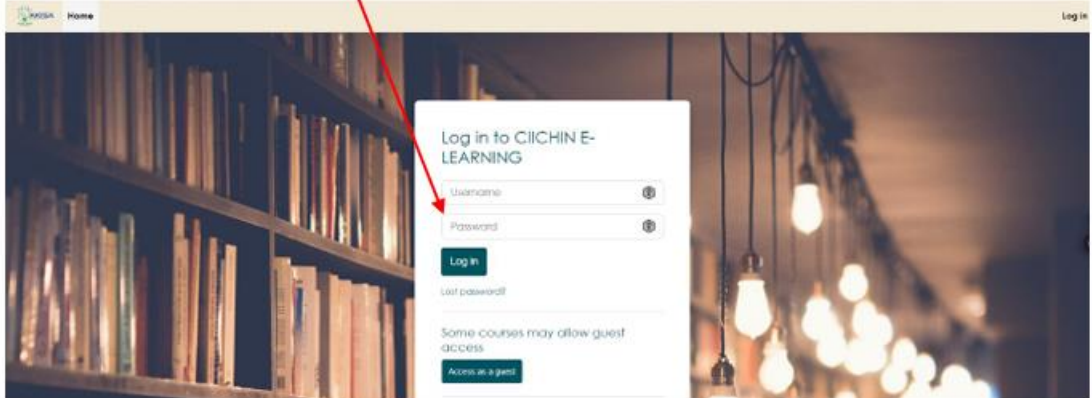
Figure 2: User Guide for Logging In, Accessing, and Navigating the Course

- **Pre-reading Resources:** Foundational readings on scientific communication and grant writing to establish a solid baseline understanding.

3.2. Course Modules

The course was divided into two main modules:

Module 1: Scientific Communication (Day 1 to Day 5)

This module covered the fundamentals of scientific writing, audience-focused communication, and the peer-review process. Topics were carefully developed and organized to enhance learners' comprehension, starting with an introduction to scientific writing and progressing through key components: Methods, Results, Discussion, and References. Key topics included:

- Structuring and writing scientific manuscripts
- Presenting results effectively to convey complex scientific findings to non-specialist audiences
- Crafting discussion sections to tailor scientific messages for different stakeholders, such as policymakers and the general public
- Understanding the peer-review process and preparing submissions for publication

Module 2: Grant Writing (Day 6 to Day 10)

This module focused on strategies for crafting effective grant proposals. Specific topics included:

- Crafting core components of a grant proposal, including problem statements, objectives, methodologies, impact statements, and program outcomes
- Preparing a detailed budget and executive summary to strengthen proposal effectiveness
- Applying persuasive writing techniques tailored for research funding
- Identifying and selecting funding sources, with strategies to tailor proposals to specific criteria
- Establishing evaluation processes and recognizing common pitfalls in grant writing, along with strategies to avoid them

Here is the link to the course: https://elearning.ciichin.org/course/view.php?id=3#section-0

3.3. Synchronous Learning Sessions

Materials were organized for optimal flow in Moodle, with modules progressing from basic principles to advanced skills in both scientific communication and grant writing. Content was structured to support both self-paced learning and live sessions.

Daily live sessions were conducted from 9:00 AM to 11:00 AM (Kigali time), with a supplemental Technical support after-session at 2:00 PM.

Live Lectures and Demonstrations: Led by Prof. Jeanine Condo, these sessions covered key concepts and offered practical guidance on scientific and grant writing.

- **Interactive Q&A:** Each live session included a question-and-answer segment where participants received personalized feedback on their inquiries.
- **Guest Lectures:** Experts from academia such as UMST contributed insights on proposal evaluation and effective scientific communication.
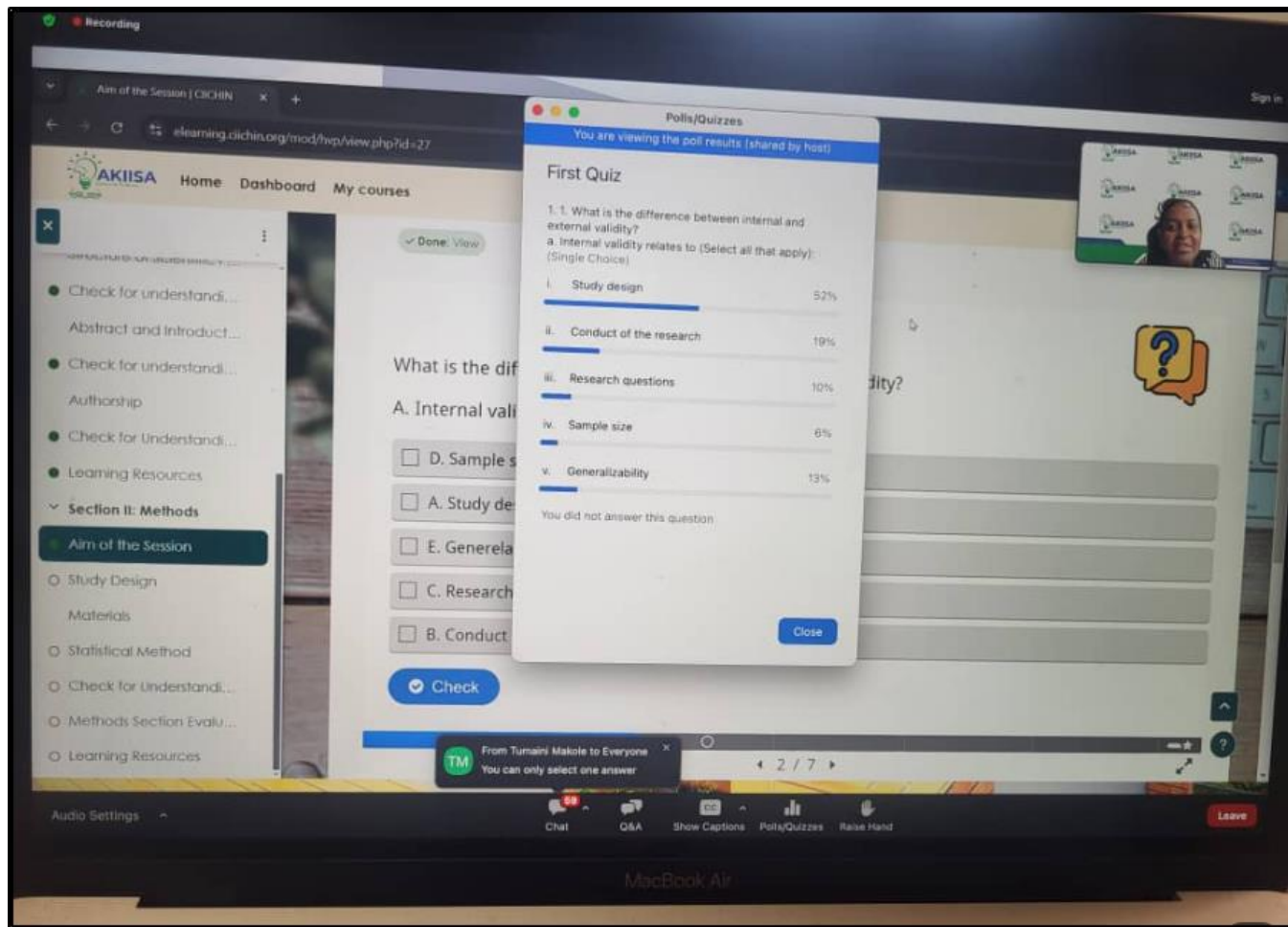
Figure 3: Interactive live sessions were attended by an average of 250 participants.

3.4. Asynchronous Learning on Moodle LMS

The asynchronous component of the course provided participants with flexible access to learning materials and activities, including:

- **Pre-recorded Video Lectures**: Covered key course topics, allowing participants to review content at their convenience.
- **Interactive Courses**: Engaging modules designed to enhance understanding through interactive content.
- **Discussion Forums**: Enabled peer discussions and facilitator interactions for each module, fostering a collaborative learning environment.
- **Self-assessment Quizzes**: Included "Check for Understanding" quizzes and a final assessment to measure comprehension and mastery of content.
- **Reading and Case Studies**: Supplementary resources offered practical applications and deeper insights into course material.

- **Learning Resources and References**: Provided continuous reading and support, ensuring participants have ongoing access to relevant materials.
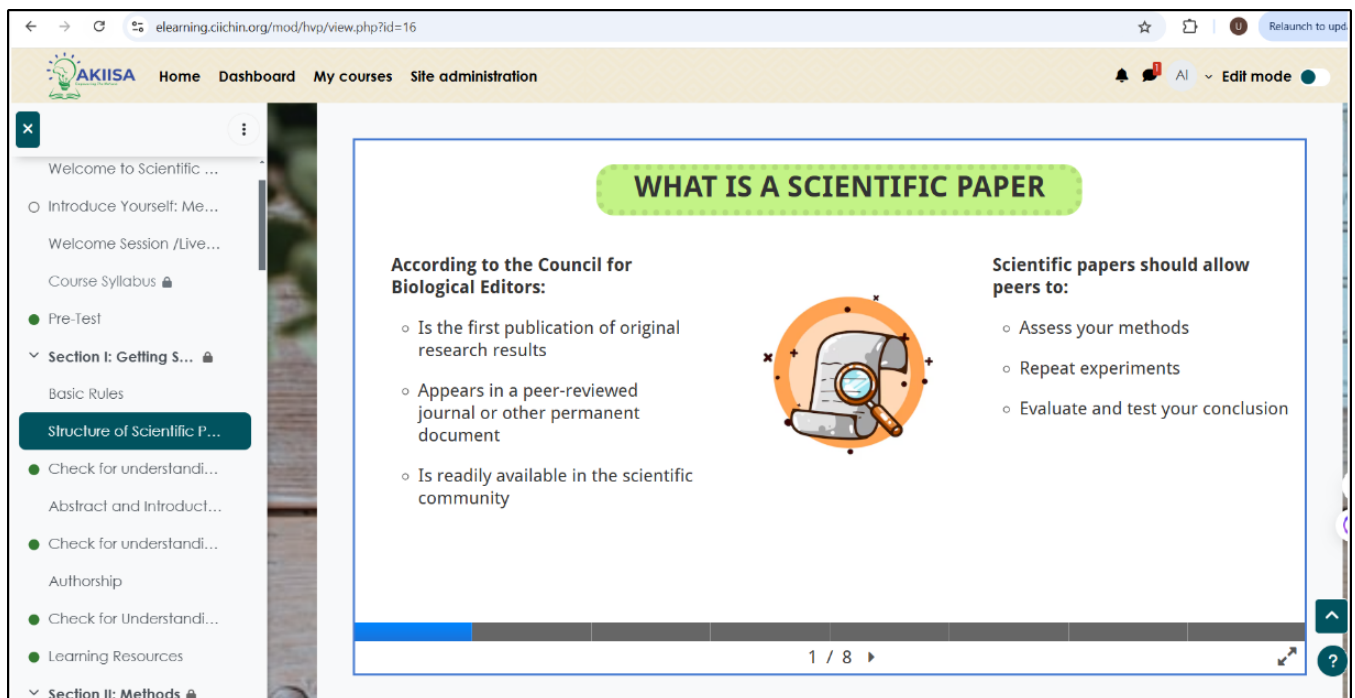

Figure 4: Course structure with learning materials and resources on the Moodle platform

Section 4. Assessment and Evaluation

A structured approach was applied to assess participant progress and course effectiveness:

4.1. Pre-test and Post-test Assessments

To measure learning gains, both pre-tests and post-tests were conducted for each module, check for understandings, and final assessment:

- **Pre-tests:** Participants' baseline knowledge in scientific communication and grant writing was assessed through pre-tests. A total of 789 participants completed the pre-test for Introduction to Grant Writing, with an average score of 70.9%.

  Additionally, 476 participants took the pre-test for Introduction to Scientific Communication, achieving an average score of 48.1%.

- **Post-tests:** Evaluated the improvement in participants' skills and comprehension following the completion of each sections under Grant writing and Scientific communication modules. Average scores were 90.6 and 63.8% respectively.

The comparison of pre-test and post-test results indicated a significant increase in participants' knowledge and confidence across both scientific communication and grant writing competencies, with an increase of 15.7% and 19.7% respectively.

4.2. Course Evaluation and Feedback

The bar graphs summarize survey responses from 291 participants concerning their satisfaction with a course and its instructor/facilitator, measured on a 5-point scale. In the first graph, illustrating overall satisfaction with the course, the majority (57%) rated their satisfaction as very high (5), 35.7% rated it high (4), a small proportion rated it moderate (3) at 6.5%, and very few were less satisfied, with 0.7% rating it as 2. None rated their satisfaction as very low (1). In the second graph, concerning satisfaction with the instructor/facilitator, 57.7% of participants rated their experience as very high (5), 37.8% as high (4), 3.8% as moderate (3), and only 0.7% as low (2), with none rating very low. This indicates that both the course and its delivery by the instructor were well-received, with the majority expressing high to very high levels of satisfaction.
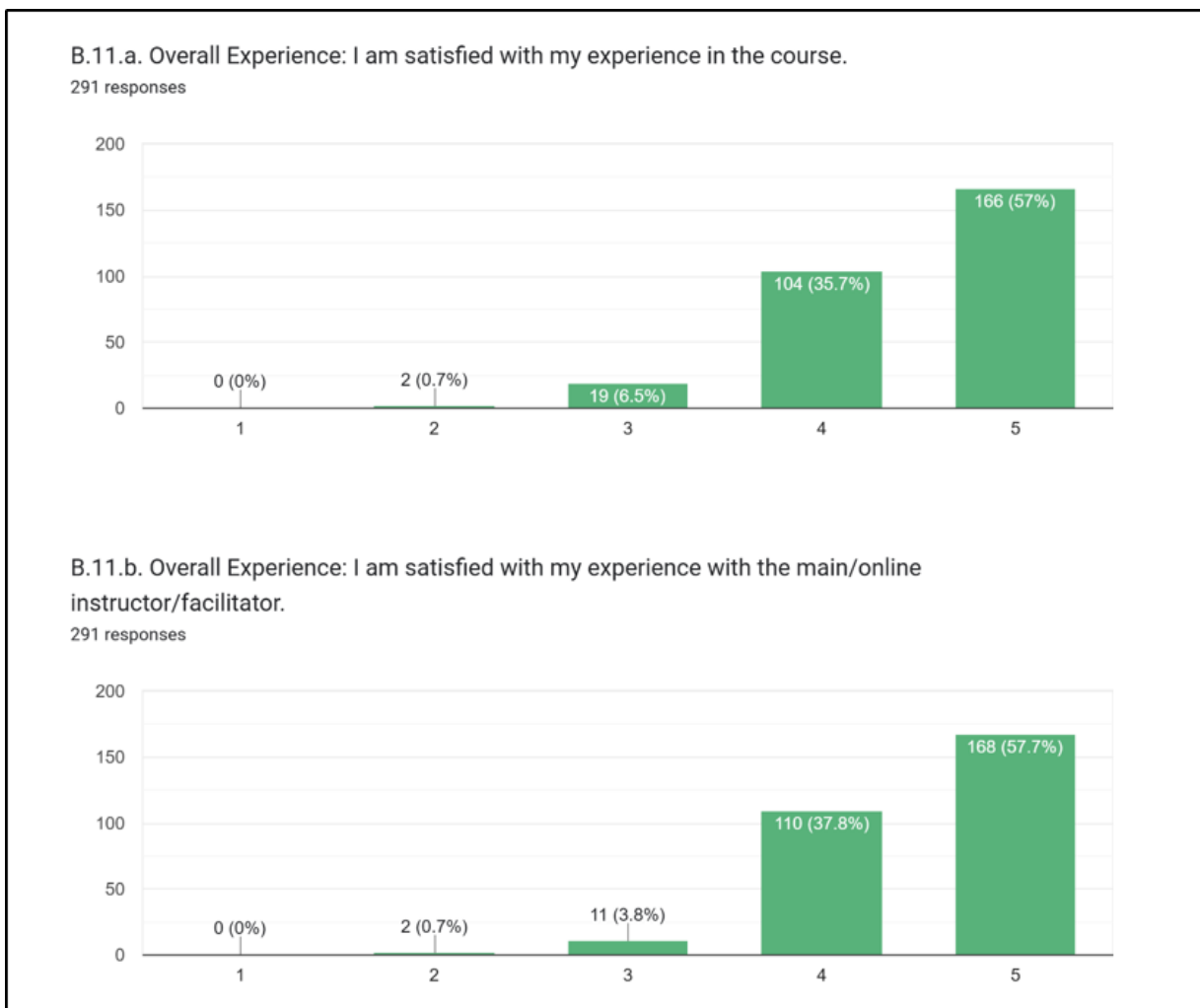

Figure 5: Participant satisfaction based on course evaluation results.

4.3 Final evaluation for grading and certifying learners

The completion statistics for a course are presented in a table and pie chart, showing varied levels of participant engagement. A vast majority, 84% or 1,900 participants, did not engage with the course content at all, demonstrating 0% completion. Minimal engagement was seen in 1% of the participants, with 22 completing between 1-25% of the course. Another 1% or 14 participants progressed through 26-50% of the course. A smaller segment, less than 1%, with 6 participants, completed between 51-75% of the course. Nearly completing the course, 10 participants fell within the 76-99% completion range. On the higher achievement end, 14% of the participants or 306 individuals fully completed the course. These participants were eligible for certification, having met the 80% pass mark set for the final evaluation, which assessed the skills they acquired during the course and served as the basis for issuing certificates of completion.
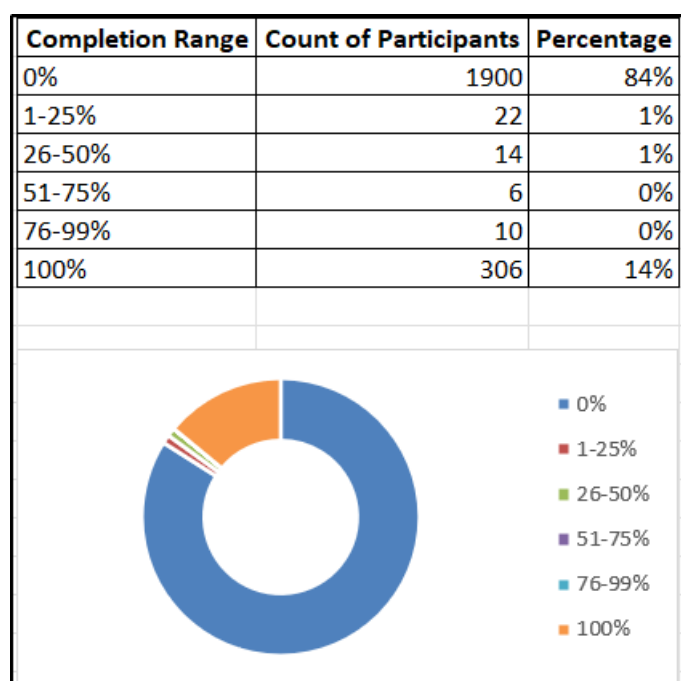
Completion Range	Count of Participants	Percentage
0%	1900	84%
1-25%	22	1%
26-50%	14	1%
51-75%	6	0%
76-99%	10	0%
100%	306	14%

Table 1: Course completion summary

Section 5. Outcomes and Impact

The course met its objectives, resulting in the following outcomes:

- **Enhanced Communication Skills:** Participants gained practical skills in structuring scientific manuscripts, clearly conveying research findings, and tailoring communication to different audiences. For example: They learned how to effectively present their research methods, results, and conclusions in a clear and concise manner, increasing the likelihood of their manuscripts being accepted for publication.

- **Improved Grant Writing Competency:** Participants demonstrated a strong understanding of proposal structure and persuasive writing techniques, essential for securing research funding. They acquired skills in crafting compelling problem statements, objectives, and impact sections, increasing their chances of successfully obtaining grants to support their research endeavors.

- **Successful Completion of Final Quizzes:** Participants who completed the course passed the final quizzes with a pass mark of 80% or above, reflecting their grasp of the core content in both scientific communication and grant writing.

- **Long-term Impact:** The skills acquired during the course have the potential to significantly advance participants' careers and contribute to the growth of the scientific community in East Africa. By effectively communicating their research through well-written manuscripts and securing funding through compelling grant proposals, participants can drive innovation, foster regional collaboration, and address pressing societal challenges.

Section 6. Challenges and Lessons Learned

Despite the overall success, some minor challenges were encountered:

- **Connectivity Issues:** Some participants faced intermittent connectivity issues, particularly in live sessions. The facilitators addressed this by providing timely recordings of all sessions.

- **Platform Navigation:** A few participants required additional support to navigate the Moodle LMS, which was addressed through proactive technical support from CIIC-HIN staff.

- **Attendance:** However, the planned number of participants were not observed. We tried to raise this with EASTECO and followed up with participants, but still few envisioned learners did not attend the course.

Section 7. Recommendations

For future iterations of the course, the following recommendations could further enhance its effectiveness:

- **Advanced Follow-Up Modules:** Participants indicated interest in more advanced, specialized modules on Research Methodology as pre-scientific writing and proposal writing.

- **Continued Alumni Engagement:** A structured alumni network could promote ongoing collaboration and skill reinforcement, allowing participants to continue sharing resources and experiences post-course.

- **Close monitoring:** A structured and close monitoring of participants is needed from organizing

organization to ensure all envisioned learners attend the course.

- **Scalability and Sustainability**: Explore partnerships with regional institutions and funding bodies to scale the course's reach and ensure its long-term sustainability. Adapt course materials for online self-paced learning within the next year to accommodate a wider audience and minimize costs.

Section 8. Conclusion

The "Introduction to Scientific Communication and Grant Writing" course, conducted by Prof. Jeanine Condo, not only achieved its intended objectives but also laid the foundation for long-term positive impact in the EAC region. Participants emerged from the course with improved scientific communication and grant writing abilities, which will be invaluable to their roles as researchers and professionals.

This training directly aligns with the EAC Vision 2050, supporting EASTECO's goals for advancing science and technology and contributing meaningfully to the region's development goals. By equipping participants with essential skills, the course has the potential to catalyze research, drive innovation, and foster regional collaboration.

Future adaptations of this course, with the integration of additional interactive elements, continued alumni support, and strategic partnerships, are anticipated to have an even greater impact on building research capacity in the EAC region. The course's success serves as a model for effective capacity building initiatives, underlining the importance of investing in the region's human capital to achieve sustainable development and scientific excellence.

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Annexes

Annex 1: Course Completion Report

This annex provides a detailed report on the course completion rates, including statistics on participant engagement, percentage completion, and final quiz pass rates. It offers insights into overall participant progress and areas for potential improvement in course design to encourage higher completion rates.

Annex 2: Zipped file of issued certificates

This annex includes a zipped file containing all certificates issued to participants who successfully completed the course.

Annex 3: Course Evaluation

This annex contains the results of the course evaluation, summarizing participant feedback on course content, delivery, and relevance. The evaluation covers aspects such as satisfaction levels, perceived knowledge gains, and recommendations for future course improvements, providing valuable insights into the course's impact and effectiveness.