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STRATEGY OF EDUCATION AND OPEN SCIENCE IN THE UNIVERSITIES OF THE MINISTRY OF HIGHER EDUCATION OF THE REPUBLIC OF CUBA

INTRODUCTION

The development of a virtual research and education network constitutes the fundamental purpose of the ELINF project. For this, it promotes research on the methods and methodologies associated with Open Science and Education (OSE) in the universities belonging to the Ministry of Higher Education of Cuba (MES). For this purpose, a set of recommendations have been prepared - hereinafter RECOMMENDATION - from which a better state of adoption and implementation of the CEA could be achieved, as proposed by international institutions such as UNCESO.

Achieving an adequate transition to the international levels in relation to the CEA implies the deployment of a ministerial and university strategy that values the RECOMMENDATION and promotes the development of actions in the short, medium and long term. In this sense, the Mission of the Strategy is: To implement the recommendations made from a systemic perspective, taking into account the strategic vision of the MES and the experiences of the universities belonging to the Red-VLIR. The effective achievement of this mission could lead to a higher state of implementation of the CEA in Cuban universities. The expected Vision: Strengthening of university training and research processes from the adoption of the CEA.

The organization of the instrument, Strategy for the Implementation of Open Science and Open Education in the Universities of the MES, is divided into the description of the actions, ordered fundamentally by the dimensions: Methodological - Legal, Investigative and Collaborative, Development of Capacities, Infrastructure and Services. Each action and expected results are dEScribed. The execution of the action plan consists of its monitoring and control instrument entitled Implementation / Evaluation Matrix, which is presented as the closing content of this document.

I. **Strategy actions**

Dimensions	time frame	actions	Expected results
Methodological - Legal	Short	1. Design of institutional policy for open access for scientific and academic production. 2. Design of an institutional policy that favors the generation of open educational resources (OER).	1. Presence of an institutional policy of open access to scientific and academic production in the CES and ECTI of the MES. 2. Existence of an institutional policy for the generation of OER 3. Presence in institutional open access and OER policies of the adoption of Creative Common, Open Data Common, GPL, LGPL and other licenses associated with the Open Source movement.

Dimensions	time frame	actions	Expected results
	Medium	1. Design of a research data management (RDM) policy, with the appropriate legal backing in the MES CESs and ECTIs. 2. Inclusion in journal editorial policies of aspects related to open peer review, FAST principles and compliance forms for authors based on open science. 3. Policy design, guaranteeing the citizen science process in the CES and ECTI of the MES.	1. Existence of a GDI policy in each CES and ECTI of the MES. 2. Existence of an editorial policy of the scientific journals of each CES with postulates of open peer review to FAST principles in addition to compliance forms for authors based on open science. 3. Existence of an institutional policy to guarantee the citizen science process from the CES and ECTI of the MES.
	Long	1. Development of IDM plan with all aspects of the data lifecycle. 2. Establishment of a control and feedback system to guarantee the citizen science process.	1. Existence of a GDI plan in each CES 2. Compliance with the control system, indicators and feedback to guarantee the citizen science process.
Research and/or collaboration	Short	1. Participation in international calls for projects on the subject (open access, OER, OER, GDI, Open Review and Citizen Science).	1. Number of international projects developed that guarantee the sustainability of the ECA in the MES.
	Medium	1. Develop research to explore best practices on the subject (open access, OER, OER, ODR, Open Review and Citizen Science).	1. Results of research on the topics (Master's theses, PhDs, scientific articles, presentations at events, etc.).

Dimensions	time frame	actions	Expected results
	Long	1. Develop research to explore best practices on the subject (open access, OER, OER, ODR, Open Review and Citizen Science).	1. Results of research on the topics (Master's theses, PhDs, scientific articles, presentations at events, etc.).
Capacity building	PERMANENT	1. Design courses, workshops, methodological activities, events on ECA for the university community and society actors.	1. Number of Massive Open Online Courses (MOOCs) on ECA 2. Number of postgraduate offerings in the CESs with explicit RCT topics
Infrastructure and/or services	Short	1. Deployment of updated and stable IT platforms to support the CAA (e.g. Dspace, Moodle, VIVO, DspaceCRIS, Open Journal System, Event Management, etc.). 2. Definition of available and appropriate preprint servers for MES journals as part of the infrastructure needed to develop open peer review.[1]	1. Number of updated and stable IT platforms for the ECA based on free and open software.

[1] A list of preprint servers for use in open peer review is listed (https://asapbio.org/preprint-servers).

Dimensions	time frame	actions	Expected results
	Medium	1. Installation of new technical capabilities in the central servers to support the Open Educational Resources (OER) computational ecosystem. 2. Deployment of a computational ecosystem with interoperable platforms based on linked data to respond to the ECA (value ecosystem developed under the ELINF project). 3. Development of structures and services in each CES to ensure the diagnosis, planning, coordination, follow-up and empowerment of the citizen science process.	1. Existence of platforms for the deposit and consultation of AERs. 2. Existence of an interoperable ecosystem for the ECA (*value the example of the ELINF project ecosystem*). 3. Existence of citizen science structures and services.

Dimensions	time frame	actions	Expected results
	Long	1. Definition of platforms for the GDI in the CESs 2. Development of a citizen science management system 3. Updating the MES Observatory Network with technological bases that allow for exchange, promotion and decision making based on ECA principles.	1. Deployment of updated and stable IT platforms to support IDM 2. Citizen science coordination plan based on the existing structures and services of the CES. 3. Presence of services in the Observatories of the CESs that favor exchange, promotion and decision-making based on ECA principles 4. Annual increase in ECA results and impacts on CESs

Implementation / evaluation matrix

Implementation Status	Methodological - Legal	Research and/or collaboration	Capacity building	Infrastructure and/or services
Initial	Presence of an institutional policy of open access to scientific and academic production in the CES and ECTI of the MES. Existence of an institutional policy to generate OER. Presence in institutional open access and OER policies of the adoption of Creative Common, Open Data Common, GPL, LGPL and other licenses associated with the Open Source movement.	Number of international projects developed that guarantee the sustainability of the ECA in the MES.	Number of Massive Open Online Courses (MOOCs) on ECA Number of postgraduate offerings in the CESs with explicit RCT topics	Number of updated and stable IT platforms for the ECA based on free and open software.

In development	Existence of a GDI policy in each CES and ECTI of the MES. Existence of an editorial policy of the scientific journals of each CES with postulates of open peer review to FAST principles in addition to compliance forms for authors based on open science. Existence of an institutional policy to guarantee the citizen science process from the CES and ECTI of the MES.	Results of research on the topics (Master's theses, PhDs, scientific articles, presentations at events, etc.).		Number of updated and stable IT platforms for the ECA based on free and open software.

Advanced	Existence of a GDI plan in each CES Compliance with the control system, indicators and feedback to guarantee the citizen science process.	Results of research on the topics (Master's theses, PhDs, scientific articles, presentations at events, etc.).		Deployment of updated and stable IT platforms to support GDI. Citizen science coordination plan based on the existing structures and services of the CES. Presence of services in the Observatories of the CESs that favor exchange, promotion and decision-making based on ECA principles. Annual increase in the results and impact of the ECA in the CESs.