University: Navoi State University of Mining and Technologies
Country: Navoi, Uzbekistan
Web Address: https://www.nsumt.uz/

[7] Governance and Digitalization

[7.12] Implementation of sustainability programs through the utilization of Information and Communication Technology (ICT) aligned with UI GreenMetric criteria

Stage	Activities/Programs	ICT Utilization	Evidence	Timeline	Responsible Team/Department
Planning	Creating a smart campus infrastructure strategy	Usage of Building management and Construction management software: Autodesk AutoCAD	Projects, drafts, feasibility studies	Jan 2024-Dec 2024	Digital Education Technologies Centre, Sustainability Commission, Facility Management Department
Implementation	Installing smart classroom technology, smart library system, face recognition sensors, software use for automation of routine tasks for administrative staff (EDO); use of software for academic staff and students for learning and teaching patterns (Hemis)	Use of Software EDO, Hemis; Use of interactive whiteboards, fire detectors, smart security system,	Purchase orders	Jan 2024-Dec 2024	Digital Education Technologies Centre, Facility Management Department
Monitoring	Centralized monitoring system (EDO)	Use of EDO for monitoring purposes	Reports from the Department of Monitoring	Jan 2024-ongoing	Department of Monitoring

Evaluation	Evaluation of ICT use on teaching, learning and administrative process through online questionnaire	Surveys, online questionnaires	Survey results	Annually evaluated	Digital Education Technologies Centre

Setting and Infrastructure Program Utilizing ICT

Planning for Creating a Smart Campus Infrastructure Strategy

Creating a smart campus infrastructure strategy involves a comprehensive approach to integrate modern Information and Communication Technology (ICT) solutions across campus facilities. The goal is to enhance operational efficiency, sustainability, and user experience for students, faculty, and administrative staff.

Activities/Programs: Development of a Smart Campus Infrastructure Strategy

1. Needs Assessment and Vision Setting:

Action Steps:

Conduct online surveys, focus groups, and interviews with the university community, including students, faculty, and administrative staff.

Analyze existing campus facilities, energy consumption, space utilization, safety measures, and accessibility.

Define the objectives of the smart campus strategy, such as energy efficiency, sustainability, improved safety, enhanced user experience, and efficient space management.

Outcome: A comprehensive report outlining the current state of the campus and a vision statement for the smart campus.

2. Feasibility Studies:

Objective: Assess the feasibility of different smart campus solutions. Action Steps:

Perform feasibility studies to evaluate the technical, economic, and environmental viability of smart infrastructure projects (e.g., smart lighting, smart security systems, smart ventilation system, and Free Wi- Fi zone).

Outcome: A prioritized list of smart infrastructure projects, accompanied by feasibility studies.

3. Drafting the Smart Campus Master Plan:

Objective: Develop a master plan that integrates various smart campus projects into a strategy.

Action Steps:

Utilize Building Management Software (e.g., Autodesk AutoCAD) to create drafts, and 3D models of proposed infrastructure changes.

Plan the layout of smart infrastructure components, such as smart sensors, and centralized control systems.

Outcome: A digital master plan with timelines for phased implementation, and a resource allocation plan.

Project Management Software (e.g., Microsoft Project, Autodesk AutoCAD):

Facilitates the planning and scheduling of project tasks, resource allocation, and timeline management. Supports collaboration among different teams involved in the smart campus strategy, ensuring smooth coordination and communication.

Evidence: Projects, Drafts, Feasibility Studies

Projects: Detailed project plans outlining the scope, objectives, timelines, and resources required for each smart campus initiative.

Drafts: 3D models created using BIM tools like Autodesk AutoCAD, showing proposed infrastructure changes.

Feasibility Studies: Comprehensive reports that assess the technical, economic, and environmental viability of smart campus projects

Timeline: January 2024 - December 2024 (Ongoing Monitoring and Updates)

Responsible Team/Department: Digital Education Technologies Centre, Sustainability Commission, Facility Management Department

Implementation: Installation of smart classroom technologies

- **Activities/Programs:** The installation of advanced tools like interactive whiteboards and face recognition sensors in classrooms. Smart library system automates library management, including book checkouts, returns, improving efficiency. Moreover, EDO software streamlines routine administrative tasks. This includes document management, task and meeting scheduling. Besides, University has a separate system for students and academic staff – Hemis. Hemis is a software platform for managing and improving academic patterns, including tracking student progress and communication between students and teachers.
- **ICT Utilization:** Interactive whiteboards, online meeting systems (ZOOM, Microsoft Teams), fire detectors, smart security systems, licenses for software's like EDO and Hemis are bought and installed.
- **Evidence:** Purchase orders could be used as evidence.
- **Timeline:** January 2024-December 2024
- **Responsible Team/Department:** Digital Education Technologies Centre, Facility Management Department

Monitoring: Regular audits of network infrastructure and classroom technology usage

- **Activities/Programs:** The EDO (Electronic Document Management System) is used as a centralized platform to monitor activities and programs across the institution. It serves as a hub where data is collected, processed, and analyzed to track progress, identify issues, and ensure compliance with institutional goals and standards.
- **ICT Utilization:** The EDO system is specifically employed for monitoring purposes, showcasing the institution's commitment to leveraging ICT tools for effective governance and management
- **Evidence:** The Department of Monitoring is responsible for generating reports from the data collected through the EDO system.
- **Timeline:** January 2024 - ongoing
- **Responsible Team/Department:** Department of Monitoring

Evaluation: Assessment of ICT impact on teaching and learning outcomes

- **Activities/Programs:** The core activity is the evaluation of ICT use in various domains such as teaching, learning, and administration.
- **ICT Utilization:** The primary methods for conducting this evaluation are surveys and online questionnaires (Google forms and etc.). These tools are used to gather feedback from such as students, teachers, and administrative staff.
- **Evidence:** The evidence generated from this evaluation process will come in the form of survey results.
- **Timeline:** Ongoing (annually evaluated)
- **Responsible Team/Department:** Digital Education Technologies Centre

Saving Energy and Climate Change Program Utilizing ICT

Navoi State University of Mining and Technologies has integrated Information and Communication Technologies (ICT) into its energy management and climate change initiatives, ensuring that sustainability and innovation go hand in hand across campus operations.

Stage	Activities/Programs	ICT Utilization	Evidence	Timeline	Responsible Team/Department
Planning	Feasibility studies for renewable energy installations (solar, wind, geothermal)	GIS mapping, renewable energy simulation software, energy modeling tools	Feasibility studies, site assessment reports, architectural design plans	2022 – 2023	Facility Management Department, Centre for Digital Education Technologies
Planning	Designing infrastructure to maximize natural daylight and ventilation	Building Information Modeling (BIM), smart building simulation tools	Smart building plans, architectural blueprints, sustainability assessment	2022 – 2023	Facility Management Department
Implementation	Installation of solar panels (772 panels, 509 kWh capacity), windmills, solar heaters, geo collectors	Project management tools, installation scheduling software, IoT integration	Installation logs, procurement contracts, renewable energy system specifications	2023 – 2025	Facility Management Department
Implementation	Deployment of LED lamps, efficient PCs, smart boards, AC units	Inventory management software, campus-wide ICT monitoring system	Appliance usage data, efficiency reports (LED 100%, PC 83.5%, AC 96.8%, Smart boards 100%)	2022 – 2025	Centre for Digital Education Technologies, Facility Management Department

Stage	Activities/Programs	ICT Utilization	Evidence	Timeline	Responsible Team/Department
Monitoring	Real-time monitoring of renewable energy production (solar + wind)	Renewable energy monitoring systems, dashboards, IoT sensors, SCADA	Energy generation reports (570,000 kWh solar + 1,314 kWh wind in 2025), performance analytics	Ongoing	Facility Management Department, Centre for Digital Education Technologies
Monitoring	Electricity consumption tracking across campus buildings (smart meters)	Energy management software, smart meter analytics	Annual electricity usage data (438,000 kWh in 2022 → 540,000 kWh in 2025)	Ongoing	Facility Management Department
Evaluation	GHG emissions & carbon footprint calculation	CO2 calculation software, transport & energy emission tracking systems	Annual CO2 emission reports (458.7 metric tons in 2025)	Annually evaluated	Academic-Methodological Department, Department for International Cooperation
Evaluation	Review of innovative and impactful programs (Eco-Mining Master's, Green Space, etc.)	ICT-based data analytics, research databases, collaboration platforms	Academic publications, international program reports, online repositories	Annually evaluated	Academic-Methodological Department, Department for International Cooperation

- **Planning:**

Using GIS mapping and renewable energy simulation software, feasibility studies were conducted to identify suitable locations for renewable energy installations, including solar panels, windmills, and geothermal systems. At the same time, the university applied Building Information Modeling (BIM) and digital simulation tools to design infrastructure that maximizes natural daylight and ventilation.

- **Implementation:**

Between 2023 and 2025, the university installed 772 solar panels with a combined capacity of 509 kWh across administrative and academic buildings, dormitories, and parking areas. Additional windmills were deployed to supply electricity to laboratories, while solar water heaters and geo power collector technologies ensured renewable heating and hot water for all university buildings. In parallel, the university replaced traditional appliances with energy-efficient alternatives: 100% LED coverage (14,814 lamps), 83.5% efficient PCs, 96.8% efficient air conditioners, 100% smart boards and printers. ICT tools such as project management systems and IoT-based scheduling supported the smooth execution of these projects.

- **Monitoring:**

The university operates renewable energy monitoring systems and smart meters that track energy production and consumption in real time. In 2025, NSUMT produced 570,000 kWh from solar panels and 1,314 kWh from windmills, surpassing its electricity demand (540,000 kWh). Annual consumption dropped from 700,000 kWh in 2017 to 540,000 kWh in 2025.

- **Evaluation:**

The university calculates its carbon footprint using ICT-based emission tracking. In 2025, total CO2 emissions amounted to 458.7 metric tons, showing significant reduction compared to past years. Measures such as paid parking policies, shuttle buses, and restrictions on motorcycles contributed to further emission cuts. At the academic level, NSUMT evaluates its innovative and impactful programs through digital research databases and international collaboration platforms. Initiatives include the Eco-Mining Master's Program (EMINReM), dust- and drought-resistant plant research, Green Space Initiative, and international climate conferences. These programs are overseen by the Academic-Methodological Department and the Department for International Cooperation.

By applying ICT at all stages – planning, implementation, monitoring, and evaluation – the university has become a model for sustainable energy management in Uzbekistan, showcasing how universities can achieve energy independence, reduce emissions, and foster climate innovation.

Waste Management Program Utilizing ICT

At Navoi State University of Mining and Technologies, the planning, implementation, monitoring, and evaluation of waste management initiatives are closely integrated with Information and Communication Technology (ICT) to maximize efficiency and sustainability outcomes.

Stage	Activities/Programs	ICT Utilization	Evidence	Timeline	Responsible Team/Department
Planning	Development of campus-wide 3R strategy; goal setting for waste volume reduction by material type (paper, plastic, etc.)	Data analysis software for waste volume tracking (year-on-year trends); digital planning tools	Waste reduction reports (2023–2025), 3R strategy page on GreenMetric site	Jan 2024 – Feb 2024	Facility Management Department, Digital Education Technologies Centre
Implementation	Paper and plastic reduction programs, 3D printing using plastic waste, segregated bin installation, composting sites	RFID-labeled bins, HEMIS and EDO online systems, 3D modeling software, IoT-enabled composting controls	HEMIS/EDO platform records, plastic model lab reports, compost site activity logs	Mar 2024 – Jul 2024	Machinery Engineering Department, Agriculture Department, Digital Education Technologies Centre
Monitoring	Real-time tracking of inorganic/organic/toxic waste volumes, treatment rates	IoT systems in compost stations, monthly tracking via university waste dashboard	GreenMetric dashboards, monthly waste volume records, composting data	Ongoing (since 2024)	Facility Management Department, Digital Education Technologies Centre
Evaluation	Annual evaluation of waste programs' effectiveness, analysis of reductions and treatment success rates	Data visualization tools, survey tools, treatment	Annual performance reports, ICT-based evaluation	Annually (each October)	Facility Management Department, Digital Education Technologies

Stage	Activities/Programs	ICT Utilization	Evidence	Timeline	Responsible Team/Department
		tracking database	feedback, GreenMetric entries		Centre, Sustainability Commission

- **Planning:**

The university uses data from prior years (2022–2025) to analyze trends in waste generation and set strategic goals for reductions. Waste categories such as paper, plastic, organic, and toxic waste are tracked using digital tools. The strategy aligns with Uzbekistan's green initiatives and is reflected in the university's GreenMetric platform.

- **Implementation:**

NSUMT has implemented multiple programs that leverage technology:

  - RFID-tagged bins for segregating waste types
  - Paperless systems using HEMIS and EDO platforms
  - 3D printing using plastic waste at the Machinery Engineering Department
  - IoT-based compost monitoring systems at Agriculture Faculty
  - Water refill stations monitored digitally to discourage single-use plastics

- **Monitoring:**

ICT tools help track the amount and types of waste produced and treated. Real-time monitoring through IoT sensors in composting sites and digital records of waste collection have allowed the university to maintain data accuracy and adjust policies promptly. Reports on waste reduction are regularly updated and published on the university's greenmetric.nsumt.uz portal.

- **Evaluation:**

Annually, the university assesses the impact of its waste management programs through data analysis tools. This includes calculating reduction percentages and treatment success rates. Feedback from stakeholders is gathered digitally to continuously improve operations.

Water Management Program Utilizing ICT

Our commitment to sustainability extends to conserving, recycling and reusing recycled water in different spheres within our campus. Navoi State University of Mining and Technologies shows it through implementing effective water conserving strategies, initiatives, programs and policy. Our main goal is to reduce our environmental impact while aiming to build health community.

Stage	Activities/Programs	ICT Utilization	Evidence	Timeline	Responsible Team/Department
Planning	- Develop comprehensive water conservation strategy - Analyze campus water usage data - Set measurable targets for reduction	-Advanced water usage analytics software	-Strategic plan documents -Analytics reports; -Target setting documentation	Jan 2024 – Feb 2024	Sustainability Commission, Digital Education Technologies Centre
Implementation	- Install low-flow taps, toilets, and efficient showerheads - Launch awareness campaigns - Deploy real-time water meters	-Smart water meters -Digital awareness tools *(Telegram, social media, university website)*	-Installation records -Campaign materials/screenshots -Meter deployment logs	Mar 2024 – April 2024	Facility Management Department, Sustainability Commission, Digital Education Technologies Centre
Monitoring	- Track real-time water usage - Collect and analyze usage data	-Real-time monitoring systems -University-developed water monitoring invention	-Monitoring dashboards -Data analysis reports	Ongoing	Sustainability Commission, Digital Education Technologies Centre
Evaluation	- Assess program effectiveness by	-Data analysis tools	-Program evaluation reports	Annually evaluated	Sustainability Commission,

	comparing data vs. targets - Prepare outcome reports	-Feedback mechanisms	- Stakeholder feedback - Comparison charts		Digital Education Technologies Centre

Planning

1. **Strategy Development**: We have developed a comprehensive water conservation strategy that includes clear objectives and measurable targets for water savings. This strategy outlines specific actions, responsible parties, and timelines for implementation.
2. **Data Analysis**: We use advanced water usage analytics software to analyse current water consumption patterns across the campus. This software helps us identify areas with high water usage and potential opportunities for savings.
3. **Target Setting**: We set specific, measurable targets for reducing water consumption based on our analysis. These targets are realistic and aligned with our overall sustainability goals.

Implementation

1. **Installation of Water-Saving Fixtures**: We have installed water-saving fixtures, such as low-flow taps, toilets, and efficient showerheads, throughout the campus. These fixtures are in all relevant facilities, including dormitories, academic buildings, and administrative offices.
2. **Promotion of Awareness**: We launched educational campaigns to promote water conservation awareness among students, staff, and faculty. We use digital platforms such as Telegram channels, social media, and the campus website to disseminate information and engage the community.
3. **Water Meter Deployment**: We have installed water meters that provide real-time data on water usage. These meters help us track consumption patterns, detect leaks, and identify areas for improvement.

Monitoring

1. **Real-Time Tracking**: We use real-time monitoring through water meters and our university`s invention to continuously track water usage across campus. This process provides instant insights into water consumption trends and helps us identify any anomalies or areas where conservation measures may need adjustment.

2. **Data Collection**: We regularly collect data from meters and other monitoring devices. We analyse this data to evaluate the effectiveness of water-saving measures and make adjustments as needed.

Evaluation

1. **Effectiveness Assessment**: We assess the effectiveness of our water conservation programs by comparing actual water usage data with the targets we set during the planning phase. We evaluate whether the implemented measures have achieved the desired results.

2. **Reporting and Feedback**: We prepare detailed reports on the outcomes of our water conservation programs.



Transportation Management Program Utilizing ICT

Our campus transportation system has embraced the use of Information and Communication Technology (ICT) to enhance efficiency and meet the needs of our community. The planning, implementation, monitoring, and evaluation of transportation initiatives are carefully integrated with advanced ICT solutions, ensuring optimal results.

Stage	Activities/Programs	ICT Utilization	Evidence	Timeline	Responsible Team/Department
Planning	- Assess campus transportation needs - Analyze traffic, schedules, peak times - Design and refine shuttle routes	Transport planning software	Needs assessment reports, Route plans	Jan 2024 – Feb 2024	Transportation Office, Digital Education Technologies Centre
Implementation	- Launch shuttle services based on optimized routes - Equip shuttles with GPS tracking	GPS tracking systems	Service launch reports	Mar 2024 – April 2024	Transportation Office, Digital Education Technologies Centre
Monitoring	- Monitor shuttle locations in real-time - Track passenger numbers and shuttle punctuality - Analyze usage data	Real-time tracking Usage analytics	Usage reports, Route optimization reports	Ongoing	Transportation Office, Digital Education Technologies Centre
Evaluation	- Evaluate efficiency and user satisfaction annually - Analyze shuttle performance data - Collect user feedback	Data analysis tools Google Forms for surveys	Efficiency reports, Survey results	Annually evaluated	Transportation Office, Digital Education Technologies Centre

1. **Planning**:

We have **assessed the transportation needs** of the campus community by analyzing factors such as campus traffic, student and staff schedules, and peak travel times. Using **transport planning software**, we develop and refine shuttle routes that maximize efficiency and minimize travel times. This data-driven approach allows us to create shuttle routes that effectively serve all parts of the campus and surrounding city.

- **ICT Utilization**: Transport planning software
- **Evidence**: Needs assessment reports, route plans
- **Timeline**: January 2024 - February 2024
- **Responsible Team/Department**: Transportation Office, Digital Education Technologies Centre

2. **Implementation**:

The university has **deployed shuttle services** based on the planned routes. Shuttles are equipped with **GPS tracking** systems, allowing both the administration and users to monitor shuttle locations.

- **ICT Utilization**: GPS tracking
- **Evidence**: Service launch reports
- **Timeline**: March 2024 - April 2024
- **Responsible Team/Department**: Transportation Office, Digital Education Technologies Centre

3. **Monitoring**:

The shuttle service is continuously **monitored.** This system allows the Transportation Office to track the number of passengers, and ensure the timely arrival of shuttles. **Usage analytics** provide insights into route popularity and shuttle performance, enabling further optimizations to improve service.

- **ICT Utilization**: Real-time tracking
- **Evidence**: Usage analytics, optimization reports
- **Timeline**: Regular
- **Responsible Team/Department**: Transportation Office, Digital Education Technologies Centre

4. **Evaluation**:

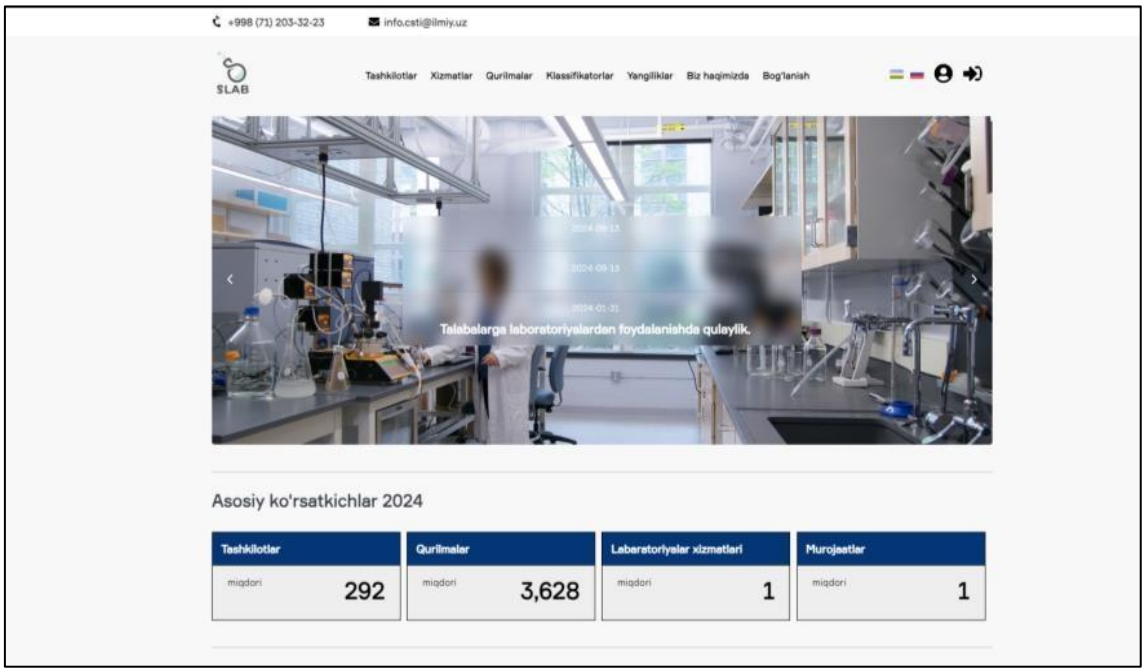
We conduct **annual evaluations** to assess the efficiency and effectiveness of the shuttle services. **Data analysis tools** are used to evaluate key performance metrics such as passenger satisfaction, shuttle punctuality, and route efficiency. **User feedback surveys** are also conducted through different google forms to gather input from students and staff, allowing us to continually improve the service.

- **ICT Utilization**: Data analysis tools, user feedback surveys
- **Evidence**: Efficiency reports, survey results
- **Timeline**: Annually evaluated
- **Responsible Team/Department**: Transportation Office, Digital Education Technologies Centre

Education and Research Program Utilizing ICT

At Navoi State University of Mining and Technologies (NSUMT), Information and Communication Technology (ICT) plays a central role in the governance of research planning, implementation, and monitoring processes. The university has adopted a structured approach using various digital platforms and tools to enhance the effectiveness, transparency, and efficiency of its research activities.

Stage	**Activities Programs**	**ICT Utilization**	**Evidence**	**Timeline**	**Responsible Team/Department**
Planning	Identify key areas of sustainability for research focus	Research management platform Monitoring.ilmiy.uz ; Microsoft Project to create research roadmaps	Online data on https://monitoring.ilmiy.uz/login	2023-2024	Department for Science and Research Innovations, Centre for Digital Education Technologies, Department for Commercialization of Scientific and Innovative Developments
Implementation	Team collaboration; Laboratory Information Management	For team collaboration university uses Zoom and Microsoft Teams; For laboratory Information Management https://slab.gov.uz/	Reports	2024 implemented	Department for Science and Research Innovations, Centre for Digital Education Technologies, Department for Commercialization of Scientific and Innovative Developments
Monitoring	Track research progress and publication output	Hemis platform	Progress reports	Ongoing/ Regular	Department for Science and Research Innovations



Planning Stage

During the planning phase, NSUMT utilizes platforms such as Monitoring.ilmiy.uz to identify key areas of sustainability research and to organize proposals, resources, and timelines. Tools like Microsoft Project support the development of structured research roadmaps, allowing for clear visualization and scheduling of activities aligned with strategic goals. These ICT tools ensure well-coordinated planning and alignment with national and institutional research priorities.

Implementation Stage

For effective implementation, the university leverages Zoom and Microsoft Teams to facilitate virtual collaboration among research teams, departments, and external partners. This ensures seamless communication and real-time coordination regardless of location. Additionally, the university uses the Laboratory Information Management System (LIMS) available at slab.gov.uz, which aids in managing and tracking laboratory data, samples, and research processes, thereby enhancing data integrity and workflow efficiency in scientific research.

Monitoring Stage

The Hemis platform is employed to track the progress of ongoing research projects and the publication output of faculty and students. Through this system, the university can generate detailed reports and analytics on research productivity, outcomes, and impact. It serves as a comprehensive tool for institutional research evaluation and decision-making.

These integrated ICT systems contribute significantly to NSUMT's efforts in ensuring data-driven governance, enhancing research transparency, and promoting sustainability-focused innovation. The active involvement of the Department for Science and Research Innovations, Centre for Digital Education Technologies, and the Department for Commercialization of Scientific and Innovative Developments ensures continuous oversight and development of ICT-based research management practices.

Additional Platforms Used:

- https://monitoring.ilmiy.uz/
- https://slab.gov.uz/

Additional evidence link (i.e., for videos, more images, or other files that are not included in this file):