



**RICE360**  
Institute of Global Health Technologies

The  
Lemelson Foundation  
improving lives through invention

 **NEST360**

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## Identifying Priorities for Invention Education in Kenya: Insights from a Cross-Institutional Faculty Workshop

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### Understanding Invention Education

The Invention Education (IvE) program enables students and faculty to improve healthcare by developing and delivering inventions that solve local and global challenges through international collaboration among universities, industries, hospitals, and non-profit organizations. Together with our collaborators in Malawi, Tanzania, Nigeria, Ethiopia, and the United States, Rice360 Institute for Global Health Technologies (Rice360) formed the Africa Invention Education Network to develop a scalable model for invention education that empowers innovators to address pressing local and global challenges.

In Kenya, there is a nationally-driven agenda to support pathways for innovation at the individual, institutional, and national levels. Rice360, in collaboration with Kenyatta University and with funding support from the Lemelson Foundation, expanded IvE in Kenya to enable universities to engage more actively in the national innovation ecosystem.

In this foundation-setting work, Rice360, in collaboration with stakeholders from universities and the broader innovation ecosystem, sought to (i) identify invention education priorities with the highest value to impact the local innovation ecosystem, (ii) engage with stakeholders in the innovation ecosystem beyond university settings (e.g., industries, innovation hubs, regulatory authorities, and funders) to understand their unique goals, needs, and opportunities with the highest value for engaging with universities in Kenya and (iii) convene invention education and innovation ecosystem stakeholders to create and disseminate a plan of action that enables universities to engage in the Kenya innovation ecosystem more fully.

### Cross-Institutional Faculty Workshop

In line with objective (i), Rice360, in collaboration with Kenyatta University, convened faculty from across six institutions (see more details about the participants in **Table 1**) to participate in a need's identification and support workshop at the 2022 Kenya Innovation Week.

<b>Table 1: Faculty and Institutions Represented at the Cross-Institutional Workshop</b>		
<b>Name</b>	<b>School/ College</b>	<b>University</b>
Eunice Atsali	Health Sciences	Kenyatta University
Mike Asiyo	Engineering & Architecture	Kenyatta University
Fidelis Kilonzo	Engineering & Architecture	Kenyatta University
Morrison Mutuku	Business and Economics	Kenyatta University
Maina Mwangi	Directorate of Innovation and Incubation and University Industry Linkages	Kenyatta University
Victor Mwongera	Engineering & Architecture	Kenyatta University
Bernard Shibwabo	Graduate Studies	Strathmore University
Julius Butime	Computing and Engineering Sciences	Strathmore University
Prof. Maina Muriithi	Engineering	Murang'a University of Technology
Kennedy Muna	Medical, laboratory services	Murang'a University of Technology
Florence Mbuthia	Nursing	Dedan Kimathi University of Technology
George Musumba	Computer Science	Dedan Kimathi University of Technology
Moses Ollengo	Directorate of Research, Innovation Management, and Community	Dedan Kimathi University of Technology
Roy Orenge	Engineering	Jomo Kenyatta Univ. of Agriculture and Technology
Caroline Ngugi	Health Sciences	Jomo Kenyatta Univ. of Agriculture and Technology
Samson Njoroge	Engineering	Jomo Kenyatta Univ. of Agriculture and Technology
Paul Miano	Engineering	University of Nairobi

This cross-institutional faculty workshop aimed to model the active learning and design education pedagogies leveraged in the IvE model by engaging in hands-on design challenges. The first activity focused on low-fidelity prototyping of solutions to keep newborns warm during transport between hospital wards (**Figure 1**). Faculty also participated in collaborative exercises to share knowledge on effective institutional programs and policies that support innovation and map challenges and priorities for IvE in Kenya (**Figure 2**).



**Figure 1:** The cross-institutional faculty workshop participants designed a transport system to keep newborns warm during transport within the NEST360 facilities.

### Challenges and Opportunities for Invention Education in Kenya

In addition to providing an opportunity to cultivate relationships with potential IvE faculty champions in Kenya, the cross-institutional faculty workshop provided valuable insights into challenges and opportunities for IvE in Kenya. There was an effort to understand existing research and innovation policies across institutions of higher learning in Kenya, which showed that all institutions have existing policies to support innovation. Many institutions have a singular entity within the institutional structure whose mandate is to support the translation of research to commercialization; for example, the DeKUT Innovation Hub at the Dedan Kimathi University of Technology and the Innovation Prototyping Integrated Center at Jomo Kenyatta University of Agriculture and Technology are dedicated to providing resources to translate faculty and student-led ideas into real-world impact. Some universities have also dedicated a portion of their institutional budget to supporting innovation priorities. For example, Murang'a University of Technology recently dedicated 2% of their annual institutional budget toward an innovation grant to support the translation of university-led innovation. Across universities, faculty leaders articulated a shared vision that increasing linkages between universities and industry is critical to supporting the translation of innovations.



*Figure 2: Workshop participants mapping out the challenges for IvE in Kenya.*

However, despite the shared awareness of the need for supportive innovation policies and the existence of innovation units within universities, faculty shared deep-rooted challenges at the institutional, programmatic, and national levels that currently impede the translation of innovation from universities in Kenya. Firstly, though innovation policies often exist within institutions, workshop participants explained that faculty and students often lack awareness of or familiarity with the policies. As a result, most students and faculty do not access and utilize the current policies or associated resources. Additionally, faculty pointed to cultural barriers within higher education in Kenya that may impede innovation. For example, faculty shared that translation of innovations is not currently incentivized across many institutions, and faculty may not feel “free to innovate” within highly hierarchical higher education systems. Lastly, the faculty shared that a “reputation of the institution” being challenging to partner with exists, particularly on issues of IP, and this may dissuade industry partners from pursuing mutually beneficial relationships.

Additionally, faculty participants highlighted challenges within the university curriculum that directly connect to the IvE model. For example, faculty shared their enduring concerns about the “disconnect” between the theoretical perspectives taught in university classrooms and the practical skills demanded by the industry. Faculty also highlighted that many university facilities are poorly equipped to facilitate practical, hands-on learning for students. Finally, faculty highlighted deeply-rooted disciplinary silos within institutions that act as a barrier to effectively translating innovations from universities, given that technology translation often requires an interdisciplinary approach.

## Priorities for Invention Education in Kenya

With these barriers underpinning the conversation, faculty participants identified two priorities for expanding IvE in Kenya:

1. **Curricular reform:** Faculty emphasized that the university curriculum should be “aligned with local realities” in order to motivate students to solve local challenges. Faculty also advocated for adopting practical approaches in content delivery to help bridge the theoretical-practical gap for graduating students entering the industry. Secondly, workshop participants shared a consensus that industry partners should be sought to provide input on priorities for the university curriculum. Finally, a common emergent theme was the need to orient the university curriculum toward entrepreneurship to prepare students for employment opportunities that may not yet exist.
2. **Partnership development with the innovation ecosystem:** Faculty suggested that progressive strategies for partnering with the innovation ecosystem must be implemented to support the translation of innovations from university settings. Notably, faculty shared practical strategies to strategically navigate the “bureaucratic” processes of forming partnerships in academia, such as replacing institutional MOUs with cooperation agreements to support the expediency of partnership development.

## Going Forward

Based on the insights from this foundation-setting grant, Rice360, in collaboration with Kenyatta University, hopes to implement a plan that will prioritize the following strategies to facilitate curriculum transformation and innovation ecosystem & university engagement:

- Set up a **design studio** at KU that will provide infrastructure for hands-on, project-based learning needed to bridge the technical skills gap between academia and the innovation ecosystem. Faculty will also be supported to leverage active learning approaches found in invention education to empower students’ innovators.
- Leverage **cross-institutional approaches** in implementing faculty programming, such as workshops and seed grants. This will help scale the scope of IvE in Kenya beyond Kenyatta University. Rice360 and KU will continue to explore strategic opportunities to sustain engagement with faculty champions identified through this workshop. A strategy that has been piloted includes partnering with the faculty champions to implement global and local design competitions.
- Consider setting up a **multi-stakeholder advisory board** for the design studio at KU to support partnership development with the innovation ecosystem in Kenya. Such advisory boards have been leveraged across the Africa IvE Network as a practical strategy for strengthening relationships between university departments and the innovation ecosystem. Additionally, Rice360 and KU will continue to enable faculty champions to **participate in events that convene stakeholders from academia and the innovation ecosystem**, such as Kenya Innovation Week, the Commercialization and Entrepreneurial Institutions Leaders (CEIL) summit, and the Transforming African MedTech Conference. Such platforms are crucial in strengthening connections between the two stakeholders’ groups, knowledge-sharing, and highlighting best practices. Finally, Rice360 and KU will continue to **engage with peers** such as the Consortium for Affordable Medical Technologies (CAMTech) Uganda, product development partnership Forum (PDP) in Tanzania, Kenya Industry and Entrepreneurship Project’s iTATU, and Research 2 Commercialization accelerator as learning partners on best practices for strengthening engagements between industry and academia for product innovation.