

Model for Developing Research Culture Experience at HITEC Institute of Medical Sciences



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Abstract

Background: Research culture includes the way we support and reward research. An important element in developing it is the organization's approach towards prioritizing research and providing an environment for enabling and facilitating researchers.

Methods: This study is based on the findings of a pilot project initiated for developing research culture at Heavy Industries Taxila Education City Institute of Medical Sciences (HITEC IMS). A multidisciplinary team was assembled consisting of focal persons from all departments for collaboration with research cell. This team was trained and given goals for leading research projects in their departments. At the end of first quarter, the idea of this program was projected in form of a model for developing and evaluating research culture.

Results A model was derived on the basis of experience and refined by the use of theories of change process, that was helpful in identifying input and process elements of the program. This was named as HITECh (Heading towards Innovation and Translating Evidence into Care of health) research model. Outcomes of the program were encouraging in terms of an increase in motivation, research thinking and number of research projects running in the college. The program was perceived by faculty as a great initiative and the whole research team supported it.

Conclusion: The program was helpful in strengthening research culture at HITEC IMS, and a model developed during the process of formative evaluation can help in guiding other institutes for planning, implementing and evaluating similar programs.

Keywords: Model, research culture, medical, planning, evaluation

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Introduction

Healthcare organizations with a strong research culture have greater productivity, higher retention of doctors and less patient mortality. (1, 2) Research literacy which is required for this culture to prevail is deficient in many healthcare professionals. However, as evidence-based practices are gaining momentum, more organizations are now getting their professionals involved in research training and evidence generation.(3)

A strong research culture is a system that supports sustained integration of evidence-based healthcare. Frameworks have identified necessary components for these systems including supportive governance, enabling organizational structures, research literacy of leaders, dedicated staff research positions, infrastructure, partnerships with universities, research skills, motivation and faculty participation. (1,3)

Developed countries have shown great progress in transforming their health systems by establishing methods for evidence-based practices. Developing countries such as Pakistan still lag behind despite the rising research needs, as there is a general trend for

producing medical practitioners rather than medical researchers. According to a report, Pakistani universities do not prioritize research and therefore do not dedicate faculty positions or time for research (4, 5) Where, Higher Education Commission (HEC) Pakistan has introduced university ranking system with 41/100 score based on their research output, Pakistan Medical Commission licensing standards do not mention exclusive research cell posts in medical colleges.(6) As a result, research mentorship and capacity remains low in Pakistan.(4) In given condition of low resources, effective strategic planning should be employed to get maximum benefit out of available resources.(2) Any effort towards research culture is considered an investment, and results in technological advancements and innovation elevating institute ranking. Culture goes through many phases before it gains momentum and matures, and monitoring and evaluation of outcomes is required to gain its understanding in order to propose a roadmap for institutions seeking higher rank in research. (7)

Keeping in view the need for research in present times, our institute initiated a program for developing research culture to generate locally relevant evidence

that came out to be successful in motivating faculty for research. This paper presents how we started a comprehensive pilot project and came up with a model of research based on observations and theoretical knowledge. We aim to propose this model for further study and adaption by other institutes working on research culture and subsequent evaluation of its fitness in other contexts.

Methodology

This is a study that used mixed-method design for monitoring success of a research culture project. This project was carried out in HITEC Institute of Medical Sciences, situated in Taxila cant. Despite being a Medical college with highly qualified faculty members there was no dedicated program for research mentorship. Thus, a program was started to promote culture of research for the faculty and students by the Head of the institute in July, 2021. In the first quarter, targets were set for only mobilizing faculty for research projects.

Methods used for mobilizing faculty members included formation of research team by nominating research focal persons in all basic and clinical departments, training, motivation of team by supportive leadership and goal setting for carrying out research.

Short term outcomes were assessed at the end of the first quarter by research cell records, surveys and focus group discussions with team. We analyzed outputs and short term outcomes by looking at number of training meetings attended by faculty, number of researches followed, motivation for research and perceiving research process as easy. We evaluated the research setup after the first quarter in November 2021 using relevant concepts and models in public health sciences. Change in culture process was studied considering social factors and phases in behavioral change interventions.

Results

Based on analysis of the above components and expert opinion a model was developed, which could help in guiding and evaluating research culture programs. Kielmann model of health system was considered relevant as it was realized that process of culture change takes place in a specific context of community who is willing to participate with research cell under facilitation of a conducive environment. Further, the research cell services were evaluated using a Logic model which helped to organize program elements into inputs that were added to the program, processes in making culture, outputs measured, outcomes gained in the immediate future and impact expected in the long term.

Adaptation of the Health System Model

A health research system can be conceptualized using the Kielmann model for Health systems (consisting of environment, health services and community participation). It can be adapted for research culture setup as follows:

1. Researchers’ participation (faculty and students in institute)
2. Active research cell services (connects the environment and the faculty)
3. Research enabling environment (innovative environment characterized by decentralization, team-based structures, wide span of control, minimal formal rules, little direct

supervision, open communication and empowered team as guided by concepts in organizational management).(2)

Adding elements from the Logic Model

Research Cell services were evaluated using the logic model by organizing its elements into inputs, processes, outputs, outcomes and impact.(8)

Adding Values

Some values regarded as necessary based on theoretical knowledge and experience in HITEC, were added to the model as shown in figure and described later.

Final HITECh Research Model

The final model proposed after combining elements of the Kielmann model and Logic model and values has been named as HITECh model of research where HITECh stands for “Heading towards Innovation and Translating Evidence into Care of health.” This model has two parts that can be visualized in Figure 1.

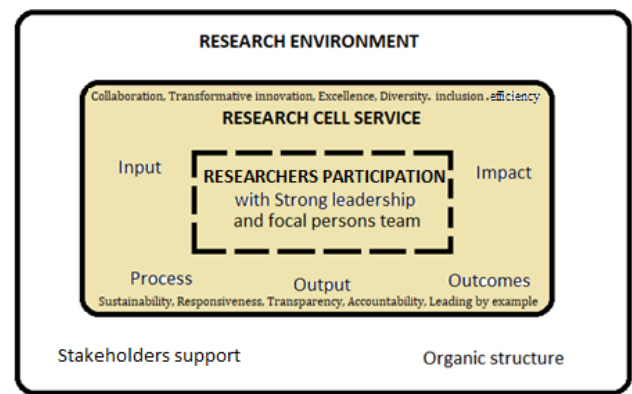


Figure 1: HITECh Research Model for Health Research System (holes in the inner component represent focal persons serving as bridge between researchers community and research cell).

Research Cell services evaluated using logic model with detail of indicators in each element is given in Table 1.

Inputs

Institute’s Strengths used in project

The Head of the institute was strongly committed to lead with a clear vision for developing HITEC institute as a research hub in the future using strengths of institute such as skillful manpower and covering gaps such as absence of a research cell and animal house for basic sciences research.

Research culture policy, strategy, values, and guidelines

All guiding documents were shared in start of project. Focal members were conveyed that they are expected to share research skills learned during training with their respective departments and guide their projects so that each department becomes self-sufficient in research. This team would connect departments with research cell and amplify passion shared by research cell.

Cultural messages

Weekly briefings on research progress by the Head of the institute in Combined Committees Meetings, monthly updates by the research coordinator, reminders on the official college WhatsApp group and recognition of researchers counted as cultural messages.

Timelines

A research culture initiative was planned as a yearly project

Table 1: The Logic Model

Input	Process	Output	Outcomes	Impact
Strengths of institute used; Funding, Strong leadership and vision, manpower	Research team building and motivation	Research trainings attended	Develop Research Thinking	Increased Research output by institute**
Research culture policy, strategy, values and guidelines	Goal setting for research publication	Journal clubs held	Develop Motivation for research	Achieving stage of Self-reliance in research for all departments***
Culture messages	Enabling for research	Research projects followed by departments	Develop Research Skills	Recognition of institute in research****
Timelines	Facilitating in research process	Steps taken to comply with values	Develop Perception that research is easy	
Accountability mechanisms			Research Culture* strengthened	
Research cell establishment				

*Culture will be measured (using concepts of organizational culture) by assessing how much researchers perceive that; 1. The research culture values are widely shared; 2. Culture conveys consistent messages about what’s important; 3. Researchers can tell stories about institute history in research; 4. Researchers strongly identify their institute with research culture; 5. Strong connections between shared values and behaviors.(2)

**Research output: Number of publications, citations and impact factor by faculty and students’ publications

***Self-reliance: It is a stage where contribution to evidence generation and use becomes a routine behavior for faculty and they no longer need any research program oversight.

****Recognition of the institute as a research hub: Means popularity of the institute as a research hub assessed through surveys, number of visitors coming to this institute for research training or facilitation, number of institutes approaching for collaboration and university ranking.

activity, with quarterly evaluations. One research year starts from 1st July and ends on 30th June of the next year. Each department was given a Gantt chart at the start of the year 1 to follow one research project.

Accountability mechanisms

This included fortnightly feedback from focal persons, monthly report writing, quarterly evaluation of the research culture project and summative evaluation after one year.

Research Cell established:

The Research coordinator was given facilitation exclusively for research work. The research cell was divided into two main units R&D Unit was specified to work on culture and enhance the research profile of the institute. Under this unit, subunits were setup including faculty research center, students research center, visitor research forum, end-user unit and data analysis unit. In first quarter of project, faculty center was activated. Student center activity was planned in second quarter. In third and last quarter of research year, visitor forum, end-user unit and data analysis unit will be activated. Data analysis unit can be a source of revenue generation by starting paid courses of data analysis for outsiders. Visitor forum will encourage researchers from outside to carry out research in our institute to further improve our culture. An End User unit was a novel idea, highly appreciated by college. It was added to monitor the use of researches done in 1st year in guiding new policies at institute, recommend future topics based on national research priorities(9), research needs of institute and its catchment population.

In the second month of the project the space available in library was used to develop a separate office for research work and was equipped with computers and latest software

to enable advanced research. Software included SPSS version 28, NVivo, SmartPLS, Endnote and Grammarly.

Process of change in culture in faculty

Research team building and motivation

Research teams were made by nominating focal persons from 18 departments (basic and clinical) under the leadership of the Research Coordinator. The aim for the team was to generate evidence (research publications), appraising research (journal clubs) and adapting research (evidence-based decisions).

Goal setting for research publication

Research team was given the goal of leading one research project in their department to be completed in a one-year period. A standard of high quality was set for them to enable researchers to take the best start.

Enabling for research

The focal persons’ team was enabled through intensive courses on research methodology using on-campus and online teaching methods.

Facilitating in research process

Research projects were facilitated to make processes easy by involving the research coordinator at all steps, helping in research projects, facilitating synopsis review and consulting authorities to simplify every difficult step thus ensuring responsiveness. Departments having lack of access to relevant data were asked to combine their projects with others to use their strengths and fill gaps effectively until mechanisms of data access were put in place.

Output

Research trainings attended

A total of 16 research lectures were delivered spanning

across 12 weeks with a mean attendance ranging from 41.2% to 69% in different months. Initially one on-campus meeting was held for training at a fixed time and later it was replaced with fortnightly meetings for project updates.

Research projects followed by departments

Before start of program, 5 researches were reviewed by research cell in a period of six months and only few continued; however this program initiated 17 projects by 18 departments and committed to facilitate all till completion. Some departments showed more interest by proposing more project ideas.

Journal clubs held

In the second month, they were given reminders and this number increased to 14 and remained higher later and retained with even less number of reminders subsequently in November. The rising trend of journal club can be visualized in the figure below.

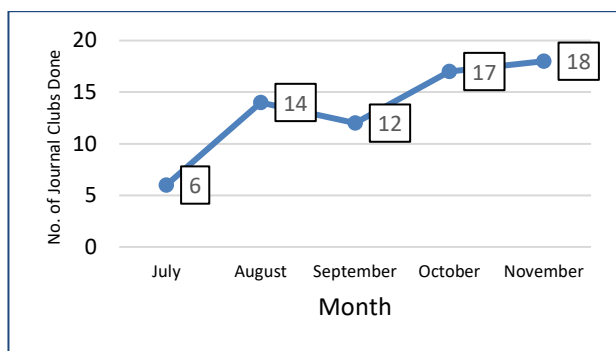


Figure 2: Trends in journal club sessions after the start of the project (n=18 departments)

Steps taken to ensure compliance with Values Collaboration

A multidisciplinary team formation resulted in 4 collaborative projects between Pharmacology and Anesthesia, Pediatrics and Psychiatry, Physiology and Pathology and Physiotherapy and Gynecology/Obstetrics departments respectively.

Transformative innovation

Only topics that were innovative were accepted for research projects.

Excellence

Research methodology was kept robust and publication in high quality journals was the goal.

Diversity and inclusion

Inclusion of different departments in research activities and research cell was encouraged.

Sustainability

Mechanisms are being considered for financial sustainability through data analysis unit. To sustain support by top management, strong stakeholders were engaged by seeking their interest in program.

Efficiency

To make this project efficient, roles were matched to skill set of teams.

Responsiveness

Any issues arising in research culture were immediately addressed by consulting authorities.

Transparency

All guidelines, minutes of meetings, decisions and their preamble were shared with the team and uploaded on an online platform (HITEC research club).

Accountability

Project updates taken by focal persons were shown in Combined Committees meetings, which were attended by senior faculty members of all departments, Principal and senior administrators in the institute.

Leading by example

The Head of the institute set an example by learning research skills, attending topic selection meetings and synopsis review meetings.

Outcomes

Improvement in skills was assessed based on quality of work observed in IRB meetings, which improved with time. Feedback regarding first quarter of the project was taken from all focal persons in focus group meetings. Later a survey was also done among focal persons to quantify these outcomes, which was filled by 13 out of 18 focal persons. Research culture was found to be at a mean overall score of 2.38 out of a total score of 3, refer to table 2.

Table 2: Focal persons' survey at end of first quarter (n=13)

Attitude towards research	Response	Result*
Do research ideas come to your mind while doing work (Research Thinking)	Yes	13 (93%)
	No	1 (7%)
How interested are you in doing research	Highly interested	5 (35.7%)
	Interested	9 (64.3%)
	Indifferent	0
	Disinterested	0
	Highly disinterested	0
How easy do you perceive research process in this institute	Very Easy	0
	Easy	0
	Moderate	8 (57.1%)
	Difficult	6 (42.9%)
	Very difficult	0
Research Culture Score		
Values of research are widely shared among faculty and not just top management		2.57 (±.51)
Culture conveys consistent messages about what's important regarding research practices. Messages are same each time and not contradictory		2.43 (±.76)
Faculty can tell stories about institute history or heroes in research		2.14 (±.66)
Faculty members strongly identify themselves with culture		2.21 (±.58)
Faculty behavior is connected to values conveyed by research culture		2.57 (±.51)
Overall mean score (by taking mean of 5 culture variables for each respondent)		2.38 (±.37)

*Result is expressed as count (percent) or mean (+SD) as appropriate. Mean score on a 3-point Likert scale; disagree, neutral, agree; here mean was calculated as considered appropriate.

Impact

Impact assessment was not relevant in this phase of project and will be assessed in future.

Study of Context

Enabling Environment

HITEC institute of medical sciences is a semi-autonomous organization with mechanistic model. However, in order to create an ideal innovative environment and to keep researchers relaxed for extra work, an organic structure with flexible environment was chosen for research cell, based on theories of management as earlier elaborated with explanation of model.

Researchers' Participation

Majority of the senior faculty consisted of retired professors having little interest in research but still, majority departments showed active support since its initiation as it was being led by Head of institute and was required for professional growth of young doctors. However, the focal persons' team comprising of some senior members was being led by a young research expert and the difference in power status was a challenge. The young leader managed by practicing servant leadership to win team while also maintaining authority through accountability mechanisms and seeking political support. Moreover, office holding by young coordinator brought uncertainties regarding power share affecting cooperation with program. This challenge was handled with communication and negotiation. Levels of stakeholders' participation/ resistance is shown in table 3.

Table 3: Number of departments in different stages of participation for change in research culture (n=18 departments)

Stage of participation	Start of program	End of First Quarter
Hostility	0	0
Passive resistance	3	0
Indifference	4	0
Active support	8	15
Self-Reliance	3	3

In a survey done at end of first quarter, focal persons were asked if they support research initiatives, 100% reported to be in support. This was an improvement as compared to the first meeting of focal persons in July where majority of focal persons considered research program as cumbersome due to workload and time taken in project approval by IRB (Institutional Review Board). Besides faculty, students were also observed to be sensitized and they started showing up in research activities.

Discussion

This paper aimed to present the idea of a research culture program for strengthening teaching institutions' research capacity that resulted in improved outcomes in terms of number of projects, attendance in trainings, and motivation for research. The logic model is assumed to be helpful in getting a detailed description of our initiative, and guide in planning, executing, and evaluating research culture programs.(10)

Our model used elements of leadership in research, trainings, partnerships, and collaboration that were

considered equally important by other researchers.(3) Similar programs in other institutions dedicated full-time research positions, high level of cooperation from management, training opportunities, and infrastructure for research mentorship.(11) Many researchers across the globe highlight the significance of research mentorship, especially when provided in early academic years.(12-15) In our program, concept of End-User unit was introduced to reduce gap between researchers and end-users, thus adding to their motivation. This collaboration was considered equally important by researchers in USA also as fragmented research has been criticized due to disconnect among stakeholders, researchers, and end-users of research.(16) Collaborative researches are now gaining more importance since the start of pandemic.(17)

One issue that needs attention is the burden of research work felt by team. It is a proven fact that researchers face more stress due to mental workload and deadlines and need psychological support. Promising approaches to reduce their stress include support from seniors, flexible IRBs, benefits and relax timelines. (18, 19)

Some limitations of this model are that focal persons cannot be considered as dependable and may have to be replaced due to lack of motivation, workload of the project, lack of cooperation by their department and resignations. More research should be carried out to assess practicality of this model in other institutes with different contexts. Performance indicators suggested by HEC for research output can also be used in redefining impact indicators of research programs. (6)

Strengths of this model are that it is based on both observations and consideration of theories of behavior change, conceptualizing health systems models and applying theories of management, leadership, organization and innovation.

Conclusion

In short, HITEC model of Research has been successful in achieving initial targets related to research culture in a very short time, despite the difficulty of context. Collaboration of a multidisciplinary team of focal persons became the keystone to the project's design. This is a cost-effective way to strengthen culture for multidisciplinary and high-quality research at an institute as it utilizes the skills of already existing resources and helps in faculty development.

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