Barriers and Bottlenecks in Globalization of Engineering Education in Pakistan

Naeem Abas[1] and Nasrullah Khan[2]

[1]University of Gujrat
[2]COMSATS University Islamabad - Islamabad Campus

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Abstract

This paper intends to examine existing educational practices, beliefs in Pakistani universities teaching engineering degree programs. It discusses the present situation of engineering education in developing countries like Pakistan, the causes that hinder the smooth process of knowledge creation and dissemination, irrationalities rooted in society and role of university leadership in keeping status-quo. Incumbent education internationalization strategies and academic entrepreneurial policies for the sustainable development are examined in the light of appalling ground realities. Following a qualitative approach, eight heads of departments were interviewed to explore the current situation, problems and the role of leadership. The findings revealed that fundamental causes include pricey education, lack of uniformity in curricula all over the country, lack of focus on practical education, misaligned priorities, rife poverty, rampant fees, business slant and simulation research practices, racial bigotry and political interferences in recruitments. The study indicates that academic leadership plays a decisive role in promoting higher education. Vice-Chancellor, with a significant position, needs to be an extraordinary individual with exceptional capabilities. The study implies that selection of Vice-Chancellor deserves great attention. Besides, it encourages regulating fee, recruiting talented local teachers, enforcing uniform curricula, imparting technical education in collaboration with local industries and raising local education standards. It offers future researchers to test present analysis empirically.

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Naeem Abas[2], Nasrullah Khan[2]

[1]Department of Electrical Engineering, University of Gujrat, Hafiz Hayat Campus, Pakistan

[2]Department of Electrical Engineering, COMSATS University Islamabad, Pakistan

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Keywords: Engineering Education; Creative challenges; Outcome based Education;

Introduction

Growing population and energy demands, expanding food and fossil fuel needs, falling quality of life, extremism and inequality are major concerns of the world (Abas *et al.* 2015a, 2015b, 2017a, 2017b). War on terror and terrorist activities on certain areas of the globe lead to an increased mass immigration towards developed countries. Such a scenario quest for an appropriate and effective education system on planet Earth to solve the major challenges to humankind. "Education is the most powerful weapon which you can use to change the world" (Nelson Mandela) and so is the power of the hands that create and spread it. The potential of the role of higher education (HE) and leadership has never been realized in the dissemination of knowledge and country development.

Higher education

With a sharp increase in learners, governments and Higher Education (HE) institutions all over the world have come under extreme pressure from learners and their families for better access to education. Research showed that the four overarching challenges faced by HE institutions are: maintaining and improving education quality, increasing the relevance of curriculum and coaching with market needs, and creating financial resources (Yasmin *et al.* 2017). Privatization and internationalization have, no doubt, become mantra of the day (Tilak 2015). The finances of HE are associated to marketing which amplified considerably with the recent transformation of HE. The drastic effects were the results of the intense rise of marketing and knowledge (Shahjahan, Kezar 2013). Reliance on corporate revenue in absence of policy may lead to distortion in research goals. Researchers investigated the problems and factors responsible for low efficiency of HE in different countries (Renehan 2015). Raffie A. Browne and Hong Shen (2017) examined the challenges of low performance of HE and found that issues like quality of education, approachability, location, institutional costs and unemployment of graduates affecting HE. While researchers felt it deem to increase the number of institutes to match the accessibility and to provide scholarship to meet the needs of the poor. Research also highlighted that a focus on theoretical knowledge only may take learners' motivation away particularly in subjects like science and languages (Yasmin, Sohail 2018a, 2018b).

Pakistani context

Our poor people have no true representation in federal and provincial assemblies, and the Vice-Chancellors (VCs) are appointed on the political basis to support education privatization policies (Khan*et al.* 2015). VCs selection criteria are based on management experience instead of academic credentials. As long as the VCs in universities and executives in national organizations are not chosen on merit there is no hope of any positive change. The honorable Chief Justice of Pakistan has recently removed the VC of oldest and largest university of Pakistan (University of the Punjab) along with three medical and one Women University on the basis of ineligibility in terms of their qualification and illegal practices (Bilal 2018). Regenerative waves of academic entrepreneurial policies eventually become the victim of their irrationalities. Research on HE was mostly limited to administrative issues, challenges (Saint *et al.* 2003) while the role of leadership was ignored. It is necessary to revisit the role and responsibilities of our VCs in modern times. The present study would address through investigation the following research questions:

1. How do head of departments perceive the present situation of engineering education in Pakistan?
2. What is the perception of head of departments about the role of leadership in engineering education?

Research design

An interpretive paradigm was followed to conduct an exploratory qualitative study.

4.1 Method of data collection

Following a purposive sampling technique, a sample of eight professors (head of engineering department) from four universities of Punjab were selected both from faculties of Engineering and Technologies. All participants had an administrative experience of 8–15 years. A profile of participants and universities is presented in Table 1. Data were collected through semi-structured face-to-face interviews. A questionnaire was formulated on the basis of literature review and research questions11Interview questions: Being head of department, how do you view the present situation of HE in Pakistan? What is the role of Vice chancellors in HE? What are the practices that restrict any improvement in HE system?. Each individual audio recorded interview was of 15–20 minutes. The recorded data was later transcribed for analysis. A consent form was signed by all participants prior to interview that stated the purpose of research and voluntary nature of their participation.

The names of universities and participants were replaced by numbers as U1, U2, U3, U4 and R1, R2, R3, R4, R5, R6, R7, R8 respectively to ensure confidentiality.

Table 1.

Profile of Participants and Institutions.

Sr. no.	Name	Faculty/Department	Experience (administrative)	University employed	Status of university: old/new
1	R1	Electrical Engineering	12 years	U1	Old
2	R2	Chemical Engineering	15 years	U1	Old
3	R3	Mechanical Engineering	11 years	U2	Old
4	R4	Computer Engineering	14 years	U2	Old
5	R5	Engineering Management	10 years	U3	New
6	R6	Environmental Engineering	13 years	U3	New
7	R7	Civil Engineering	8 years	U4	New
8	R8	Electronics Engineering	9 years	U4	New

Method of analysis

A constant comparison approach was adopted to analyse the data. Multiple readings of data helped to break down the text into codes. Initial codes were reduced into major themes as Carol A. Bailey (2007) suggested.

Results

When participants were asked about their views on HE, an analysis of their responses highlighted two major themes: present situation and role of leadership.

Present situation and role of irrationalities

An examination of present educational culture highlights incongruent and irrational practices. Firstly, "our literacy rate is 50% as 50% population lives below the poverty line. The literacy rate is high in urban areas and low in the countryside which are the home of 70% population", shared R7. Media reports and economic surveys explicitly showed a fall in literacy rate as reported in daily English newspaper *The Nation* 18 January 2018. Education privatization, internationalization and entrepreneurial policies are focused on corporate culture (Zolfaghari *et al.* 2009). Advisers propose to recruit internationally educated faculty which is a bolt from the blue. Expensive education business has brought the 200 million people down to their knees. We have 52 million 5–16 years old children out of whom 25 million are out of school due to high education fees (Ransel 2011). One participant R8 criticized that "academic entrepreneurial culture is appealing, but superstructures cannot be built in the air, they need foundations and middle infrastructures". According to him, academic entrepreneurship in a nation with 50% literacy rate is a false premise with phony promises. Another participant R5 called the present situation as pitiful, as he said

"the present situation of higher education in Pakistan is very pathetic and I think it's merely on account of increasing the numerical strength of enrolments in higher education that they have ignored the quality of education. The capitalists, they are trying to maximally engage a higher number of students in higher degree programs and I think it's the capitalists who are behind this scheme and they think that buildings are empty when students leave at 4 o'clock. And they just want to use those building by introducing evening programmes and weekend programmes and they are compromising the quality of higher education in Pakistan in that way".

A widely held view is to ask university managers and leaders for steering in the right direction. Poverty and education are implicitly interlinked entities, but luxurious smart schools are not the answer. Pricey education would drive the nation into a deep dark well without any exit window as was pointed out by earlier studies (Browne, Shen 2017; Renehan 2015). "We are facing an unprecedented human crisis of 25 million children who cannot afford pricey education" as R6 further called it an alarming situation under which expensive education business is mandate to nowhere whereas the height of irrationality is that our Chief Minister of Sindh and Chief Minister of Punjab are more concerned with buying helicopter and metro/bullet train projects respectively (Punjab Social Protection Authority, Government of the Punjab 2016). Our 25 million children (13%) are out of school as they cannot pay the hefty fees. It is akin to American United States Agency for International Development (USAID) scholarship program under which the need/merit-based financial grants are given to those students whose parents have an annual income less than 35 000 Pakistani rupees (PRs). Parents with a monthly income of 15 000 PRs cannot afford to pay school and college fees to enable their children to reach university to avail USAID scholarship. Insular administrators reroute the grants to their race students to complete the formality (Higher Education Commission, Pakistan 2016). Millions of children unable to pay the school fees might reach madrassas funded by Islamic countries; 10% of these madrassas were speculated to be involved in extremism activities. Besides, lack of opportunities in job market drive some of the graduates to terror groups who use them to deploy communication technologies in suicide and remote control bomb explosions as discussed in our earlier work (Khan, Abas 2015).

Secondly, as participants pointed that no three schools have similar courses and fee structures. Business, nationalism and religion focused educations in private, public and religious schools are leading youth to different directions as R2 reported,

"If we continue teaching A for assets, B for budget, C for command, E for economy, G for

government, S for state and T for treasury to elite children in private English medium schools; *alph* for *anar* (pomegranate), *bae* for*bakri* (goat), *pae* for *punkha* (fan) and *lam*for *lota* (utensil) in Urdu medium public schools; and *alph*for Allah (God), *bae* for *bismillah* (begin with name of Allah), *tae* for *talwar* (sword), *sae* for*sawab* (reward), *geem* for *jihad* (Holy war) or Jannah (heaven) and *zae* for *zakat* (Alms) in religious Madrasas then they will grow with different mindsets".

Our education system reflects the 3D perspective of utter failure. Incoherent Arabic, English and Urdu education systems with rambling syllabi pull and push students in opposite directions as depicted in Fig. 1.

Figure 1.

An epitome of the gainsay education system.

Source: created by authors.
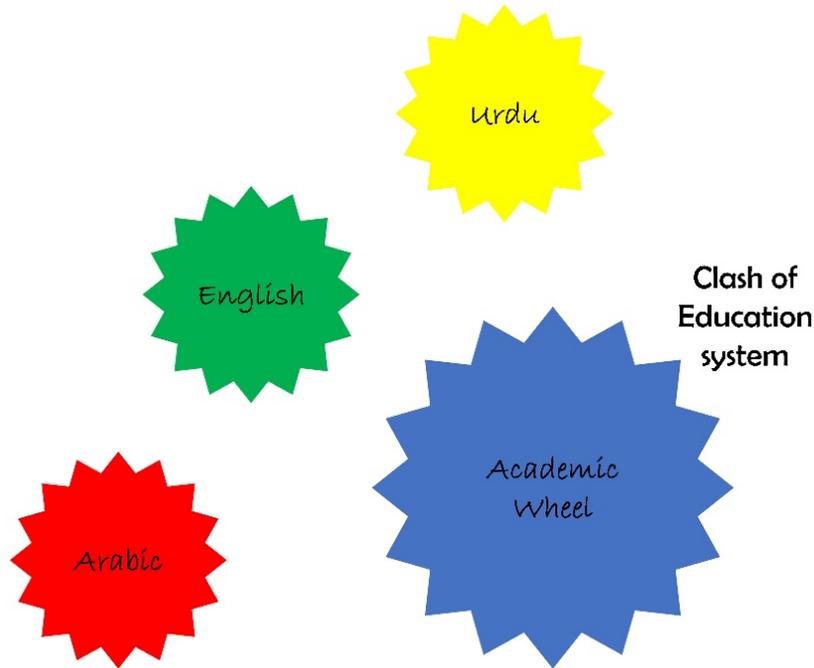
Thirdly, private colleges stopped giving students exposure to laboratory work over one decade ago, and universities purchased simulation software and simulators instead of imparting practical experience. As R2 expressed, "it is strange to see university professors churning out 600 research papers and there is no hardware proof of any research". If the research work was done without any experimental setup, then it is theoretical science, not the engineering. All software research without hardware is mandated to nowhere. Eight education boards in Punjab have decided to restart practical exam for 9th class with effect from 2015 (Higher Education Commission, Pakistan 2016). Private schools do not conduct practical (lab work) work nor demand students to complete practical copies. Schools get information of practical from educational boards somehow to help prepare students few days before the practical exam. They distribute solved notebooks of laboratory work among students to complete overnight. Private school networks are destroying the education system by saving money out of experiments.

Lastly, as R1 believed that "even if someone manages to obtain the degree, he cannot get a job due to racial discrimination in public service departments including universities". The government has started appointing

loyal junior officers to higher posts as bureaucrats used to do in the past. Inherited politicians and dual national bureaucrats are the root-cause of most corrupt practices. People are not aware of the outcome of privatization process, but they worry when the corrupt politicians and bureaucrats trumpet privatization, globalization, and internationalization. They bring their kith and kin as foreign consultants on fat salaries. Extremism in our society might not be any imported evil it could be the logical consequence of our biased policies and practices. Our incumbents straddle across religious and racial spheres. An ideological state with nukes facing widespread corruption, racial bias and extremism cannot have any place on the planet (Kalair *et al.* 2013). Consequent to such practices of appointing VCs and chief executives in academic institutions, the knowledge-based economy movement has already ceased (Ashfaq 2015). If we continue to remain wangled to wharfs of a dissolute racial bias then we are waiting for lightning which would never strike.

Role of Vice-Chancellors

All participants believed that the most crucial place and role in HE is of a VC who is the chief academic and administrative officer at any university. They listed powers and functions of a VC. VC's core function is to provide leadership, academic and administrative to the whole of the university and securing funds to allow the delivery of the academic mission, aims and objectives. In addition to everyday job he also carries out certain ceremonial and civic duties.

6. 1. Powers and functions

According to participants, a VC wears multiple hats during his service. As part of the Chancellor's Office (CO), he provides executive leadership in assisting the CO in planning, developing, organizing, directing and controlling academic programs, policies, procedures and guidelines. He supervises deans and directors in evaluating and approving their recommendations for faculty hiring, promotion and tenure. A VC oversees budget preparation for the academic programs, allocates funds and manages resources to achieve academic goals and objectives. He provides leadership in creating and maintaining academic standards and policies. He serves as Chief Advisor to the Chancellor (President or Governor). A VC has a team of appropriate professional administrators, directors, deans, chair persons and heads of departments (HDs) for his assistance. A successful VC, as one respondent R3 said, "Vice-Chancellor maintains substantial contact with administrators like directors and deans through Board of Governors, syndicates and Academic Council meetings. The Vice-Chancellor can convene meetings of committees, bodies and authorities whenever he considers necessary. He can speak at any forum but has no right to vote". Hence, it is VC's duty to ensure that government directives, provisions of act, statutes, ordinance and regulations are being observed in decisions of authorities, bodies and committees. He supervises the recommendations of Selection Board on the observance of merit in recruitments and promotions. He can undo decisions of authorities, bodies and committees inconsistent with the act, statutes or regulations. The VC can take any decision during the emergency but is bound to communicate its justification to the Chancellor or University Management Council (MC). The VC is the appointing and disciplinary authority for teachers, yet if his decision affects any teacher, then a notice with reasonable time must be given to the victim to appeal to the MC. The VC has right to initiate inspection of any person, body, building, laboratory, library, workshop and equipment at university or affiliated college if the matter relates to finance of university. In the case of nonprofit organizations the VC or Rector performs his functions by the general policy guidelines laid down by Board of Governors (BGs). These guidelines must be accessible to the general public through the Internet. Non-government organizations running universities in developing countries often hide these guidelines and modify the sentences according to their needs in court cases. Members of BGs are appointed on the racial basis to maintain their absolute majority. This ethnic majority only recommends like-minded fellows to sustain their absolute monopoly. This language, race and religion based cartelism is also visible in public sector universities and the government institutes (Tan, Sharma 2013).

Some participants like R2 and R5 compared the roles and perceptions about these roles in East and West. R2 added, "Here VC and his role means powers and duties, whereas they (European universities) focus on

the role and responsibilities". Of course, both phrases "powers and duties" and "role and responsibilities" mean the same but leave impressions of "Imperialism and Slavery" on reader's mind. Our words reveal whatever we hide in hearts. Words "powers" and "duties" are extreme words reflecting inherited slavery. India-Pakistan executives struggle hard for executive posts and then exercise every sub-clause to avail the opportunity. A VC's position means different to different incumbents in East and West. Asians VCs look to Western universities for collaborations to upgrade their ranks, but they look to Asian universities to monitor their state of the art and earn money. Western universities have started dual and joint degree programs with Asian universities to make money using their internationally recognized names.

The Chancellor is a political figurehead in commonwealth countries but a chief executive in other nations. Universities having a large number of affiliated colleges may employ VCs for them. The Chancellor and VC's jobs mean different things to different incumbents. As R4 said,

"everybody understands the role and responsibilities of Vice Chancellors but the part they play does reflect their mindsets. It is quite dangerous to be purely a chief executive as at heart it is all about teaching and research".

Universities have grown regarding their economy, yet they are a long way from being an academic cottage industry. Universities are cash rich institutes, but their major focus is to prepare skilled human resources to bring social change. Community respects institutes of higher learning, but if one sees the deep dark march of follies, then he/she will quickly realize that people of similar sects and races are visible on all key posts. Shamshad Ahmad, Foreign Ex-Secretary, in his article on Renaissance of Pakistan has explicitly pointed out undercurrents against ethnic and racial priorities which are more visible in universities. To ride through merit barrier, the bureaucracy fixes 60 marks for real unchallengeable credentials and 40 scores for interviews which are often the cause of ethnic decisions. If it becomes unavoidable to employ any out of cloud expert due to professional reasons then his/her salary is fixed at the abject minimum with the verbal promise to increase later due to one or other reasons. They use performance-based criterion to justify his/her low salary giving abundant emoluments to their incompetent people.

6.2. Asymmetry in dealing with subordinates

It is sad to note some of the VCs have granted salaries in the range of 0.5 to 0.7 million to junior professors and 0.2 to 0.35 million salaries to senior far more experienced professors on ethnic grounds (Tan, Sharma 2013). "This is ridiculous to see that those who fail to compete on merit are appointed with even higher salaries in administration", said R1. A few VCs have been noticed awarding foreign scholarships to their own race fellows and barring others to undertake HE even at their expenses in local universities. R1 further said, "I personally believe that researchers are not taken into confidence when policies are designed". R4 shared his observation as

"they grant brand new cars to their executives and force the actual professors to park their private vehicles outside the campus. The executives come in chauffer driven official cars at 9 to 10 *a.m.*and leave at 5 *p.m.* forcing others to come at *8.30 a.m.*and go home at *9 p.m.* ".

Courts give no justice as they use the official money to hire expensive lawyers to knock down complainants. BGs or Senate is competent authority to hear complaints against the VCs, but this conglomerate is even worse in attitude. "I feel cold on the mindset which is driving the education sector", R1 shared. It was also reported that industrialists convene interviews to shortlist private institute executive to appoint as VCs in public sector universities. Media says "education" will bring the social and economic change but cult executives are intended to enforce corporate culture. Many anchors, journalists and writers also help racists to accomplish their campaign. They grant scholarships on ethnic grounds to fortify their own race under strategic policies. R3 called it a disappointing situation as he added, "I see many states promoting their own communities within the state. We could not transform ourselves into a single united nation in 67 years due to these pathetic practices which continue to date".

7

It is time to fix the millennium development goals. To keep the social fabric intact it is time to transform education for sustainable development which moving to privatization. You cannot ask a criminal to pay you money to take advice for abandoning the kidnapping or target killing profession. Education is light with which you see good and bad. An illiterate person is a blind man who needs societal support to see. There is no dispute on the importance of the commercial entrepreneurship in the socio-economic development of society, but education business would limit the access of actors who play the live drama. Universities have been incubation center of innovations not business. Business institutes and networks tried to apply the entrepreneurial academic model in Pakistan, but it failed due to racial and corrupt practices. Forget the evil and investigate the cause, what practices do not allow the proven ideas succeed in Pakistan.

Conclusions

An intense examination of irrational educational practices and the role of leadership leads researchers to conclude that unless drastic changes are made, a devastating societal image retains. Findings revealed that HE system is thwarted by a number of factors, including pricy education, lack of uniformity in course and fee structure, lack of focus on practical knowledge and unavailability of jobs. Power of decision lies with VCs, who owing to partiality and nepotism have become source of irrational practices. The study maintains that solution lies also within leadership.

Present study imply that it is time to develop uniform curriculum, facilities and examination standards in public and private institutes of all provinces. Uniform education system can override the sectarian factions and class differences. Academic entrepreneurial policy in universities is a good idea but education privatization in 50% literacy rate state may lead nowhere. Appointments of executives of private universities as VCs in public sector universities to expedite the education privatization must be discouraged. Academic revolution can be based on truly entrepreneurial institute with financial support from business communities. Industry is reluctant to supply subvention due to racial appointments of incompetent professors. Xenophobic advisers do gnat knowledge-based economy stories without realizing that superstructures cannot be built in air. Schools constitute the founding and intermediate structure on which remotely visible university superstructure can be built. Priorities must be redefined and direction of action must be readjusted. Despite pouring billions on laptops for elite students, 25 million poor students begging on crossroads must be provided with an access to free education. Oligarchies may live to tell the tale but biased societies cannot survive. Study alarms that if we continue to be foisted to the moorings of decadent racial systems then nothing can stop us becoming a botched state.

Declarations

Ethics approval and consent to participate

Proper approval has been sort from all participants of this study. All the proceedings are approved from ethical committees of both Universities.

Consent for publication

All authors approved the manuscript and agreed to proceed for publication.

Availability of data and material

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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