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Higher Education Quality Assessment at a Public University: A Baseline Index Model

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Abstract

In the wake of transition from least developed countries to the lower middle income countries policy makers should rank higher education quality at the top since the role of educated and skilled manpower is undeniable**.** Higher education in Bangladesh underscores cognitive learning in place of market-oriented skills such as using reasoning, understanding, communicating, applying knowledge, and solving real-life or workplace problems. This study evaluates the quality of higher education which may contribute to preparing the students for a better future. In this attempt identifying the critical attributes of quality higher education and forming and quantifying the value of Higher Education Quality Index (HEQI) has been done. Exploratory method has been used to identify higher education quality indicators for constructing the HEQI and it followed the reflective measurement approach of Structural Equation Model for quantification of the indicators. The HEQI scores are found to be ranging from 62.71 to 100 for all the respondents with a mean value of 84.74 and a median value of 84.62. Among the various factors of higher education, the study was emphatic respectively on knowledge, research, morality, professionalism, volunteering activities and creativity. Accordingly, it is found that knowledge explained a major portion (46%), followed by morality (12 %), professionalism and volunteering (10.5 %), and creativity (5 %) of the variation of the outcomes of HEQI. The study recommends improving the quality of higher education by facilitating market-oriented skills in Bangladesh.

Keywords**:** Economics graduates, Higher education quality index, Baseline index, Structural equation modeling.

1. Introduction

Higher education has enormous potential to play a pivotal role in promoting prosperity in the developing nations. To a large extent, development of a modern society depends on the nature and standard of higher education. In Bangladesh, higher education is less focused towards building a thriving society. It is observed that a large portion of the youth population with higher education are less equipped with the skills to analyzing specific situation, evaluating alternative solutions and properly defining their personal

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goals. According to the Bangladesh Institute of Development Studies (BIDS), most of the students from both public and private universities are graduating with poor job related and other basic knowledge, disqualifying them from the country's job market (Jasim, 2022).As a result, the unemployment rate among people with tertiary levels of education has risen considerably, as revealed by the Labour Force Survey (LFS) conducted by the Bangladesh Bureau of Statistics (BBS) in 2018. According to this report about 46 percent of the country's unemployed youths are university graduates.

In this situation providing quality higher education that focuses on building 'life skills', not just academic training, is a demand of the time. Therefore, evaluation of the current higher education practices is becoming increasingly important to cater to the needs of the domestic as well as the international job market for the students and for the progress of the nation as a whole.

This study focuses on evaluating the quality of higher education for the economics graduates which is the broad objective of the study. The job market for economics graduates offers jobs in the domains include business, finance, marketing, and data analytics. The respective domains include the government, international and nongovernment organizations, and the corporate world both at home and abroad. In order to evaluate the quality of higher education of economics graduates in these domains, this study has undertaken two specific objectives - identifying the critical attributes of quality education and forming and quantifying the value of HEQI. A survey on the key stakeholders has been applied to identify the specific factors of higher education that are relevant for Bangladesh. Structural equation modeling has been applied to check the validity of the factors in forming the HEQI as a latent construct for the study. The study demonstrates that how the factors of HEQI may individually influence the performance of higher education and accordingly suggests interventions for making the educated youth more effective in building a healthy society and a strong economy.

Though there exist several research studies on higher education quality in Bangladesh, it is very difficult to find one which concentrates on the perceptions of both student (as employee) and the employers about the quality issue of tertiary education considering them as stakeholders or clients. In this spectrum, this study is an effort to validate the actual demand and supply of higher education attributes in the job market and thus proposes policy options for ensuring the quality of higher education in Bangladesh as per the requirements of the job market. Additionally, the study undertook a first time comprehensive list of higher education attributes which goes beyond the shallow macro level evaluation indicators. Recent categories of quality education include population and school enrollment, expenditure cost, education return, context of learning, school processes and resources, community factors and academic performances (Bowe, 2015).

The paper is structured as follows: The background of the research topic is stated in section 1. Section 2 provides the theoretical and analytical framework of the study. Section 3 focuses on the methodology of the study. The empirical results and their interpretations are presented in Section 4. Finally, Section 5 provides the conclusion of the study and the way forward.

2. Theoretical Framework and Literature Review

Theoretical Framework

Some specific theories are envisioned to framework the importance of graduates' qualities that includes: human capital attributes, social capital attributes, higher education institutions attributes and other influencing and moderating factors. Skinner's Theory of Behaviorism stated that individual's reactions to an event may cause changes in behavior(Skinner , 1963). According to Watson, only events that can be observed are the entities of psychology (Watson, 1930). When defining behavior, these theories dramatize changes in behavior that are produced from stimulus response correlations conducted by the student(Parkay & Hass, 2000).

Motivation theory introduces the application of interactive simulations which is one of the graduates' attributes of higher study. According to Kapp (2012), there are two types of motivation related to interactive simulation- extrinsic and intrinsic. Driscoll (2005) further expressed that motivation is realized when students successfully attain their current learning goals and get motivated to selecting and engaging in additional learning activities(Driscoll & Burner, 2005). Understanding motivation theories, such as the reinforcement theory, can provide valuable insights into organizational behavior and help enhance employee engagement and productivity (Skinner, 1963).This will cultivate work place efficacy through establishing punctuality, commitment to the company employed, decision making skill, and enthusiasm in the employees (Wei & Yazdanifard, 2014).

Human development or capabilities focus on a range of values including knowledge generation, professional preparation, cultural knowledge and enlightenment of the public sphere(McLean, Abbas, & Ashwin, 2012). In this regard, not only is education a critical component of human capital development but its 'value' could become a means, an end, and even a conversion factor to expanding the capability, freedoms of youth to make choices that they value(Chiappero-Martinetti & Sabadash, 2014). When evaluating the employability of graduates from the demand side, employer's perspective of the skills and knowledge of employed graduates are also evaluated- emphasizing a human capital approach to graduate employability skills.

Schultz (1961) stated education and economic development as "nation's capability to productively use physical capital is a function of its level of human capital" and added that if human capital does not rise alongside physical capital, the result would directly affect economic development (Schultz, 1961). Also, Breton (2012) elaborated on Schultz's theory and stated that education presents a wide and important factor in the economic development course.

Literature Review

To flesh out the Graduates' Attributes in the context of higher education, it is necessary to clarify the properties that competency criteria should possess. Nowadays, new entrants in the labour market are required to have both "hard" and "soft" skills; the latter also being known as '21st century skills'. The Organization for Economic Co-operation and Development (OECD) defines these as being necessary for young people to become effective workers in the present knowledge society (Ananiadoui & Claro,

2009).Among many skills some scholars were particular on digital skill(Van Laar, Van Deursen, Van Dijk, & De Haan, 2017). Employers are highly satisfied with the business graduates' understanding of job related information, knowledge about business, and information technology (IT) skills which they consider as essential for successfully performing their jobs (Plantilla, 2017).

The generic attributes such as critical thinking and problem-solving are gaining high importance these days when they can be contextualized to the discipline (and a host of other local factors), and thus, each degree programme needs a contextualized graduate profile (Jones, 2009, 2013; Litchfield, Frawley, & Nettleton, 2010).There is no alternative to updating knowledge by the graduates' to cope up with the market demand. The higher education landscape is shifting under neoliberal forces that are increasingly aligning with the goals of business, government and education (Giroux, 2010; Ingleby, 2015). It is imperative that the graduates understand, through the benefits and constraints of their disciplinary perspectives, who they are and the ways they can positively contribute to the heterogeneity in their local, regional and global communities (Barnett, 2004).In addition to the traditional higher education, which focuses on domain-specific knowledge and general skills development, higher education recently also aims to develop boundary crossing skills-the ability to change perspectives, to synthesize knowledge of different disciplines, and to cope with complexity (Spelt, Biemans, Tobi, Luning, & Mulder, 2009). Interdisciplinary approach can help to address today's complex issues since it is believed that a cross disciplinary approach facilitates a comprehensive understanding (Newell, 2009).

Employers today are looking for the personal qualities of their employees such as flexibility and willingness to learn as well (Plantilla, 2017).In this regard creativity has been regarded as one of the crucial skills in the toolkit of the 21st century learner (Jahnke, Haertel, & Wildt, 2017; Nissim, Weissblueth, Scott-Webber, & Amar, 2016).There is also evidence that creativity is a specific requirement in terms of day-to-day teaching practice where the intention to learn generates ideas and possibilities, invent ways of exploring problems, complex situations and systems or combine ideas and things in novel ways(Jackson & Shaw, 2005). Today, the term creativity is employed in many different contexts with an increasing recognition of its value in numerous domains including technology, business and entrepreneurship (Cooper, 2000; Zimmerer; & Scarborough, 2008). Some defined it as a personal characteristic while others as a process (Amabile, 1988).Employees' creativity has significant positive relationship with organization innovation capability and firm performance (Hassan, Malik, Hasnain, Faiz, & Abbas, 2013).

Research is another attribute of the graduates to become innovative, creative and re-equipped. The development of student research skills at university has been linked to the skills associated with critical thinking (Wass, Harland, & Mercer, 2011) problem-solving(Missingham, Cheong, Serfas, Phadke, & Symes, 2016)and employability (Bandaranaike & Willison, 2015), especially in the workplaces of those who become employed graduates (Willison, Sabir, & Thomas, 2017; Wilmore & Willison, 2016).A review of literature on research skills include information seeking skills, communicating

(and submitting and writing skills), methodological skills and data analytics (Meerah et al., 2012). Statistical literacy and scientific reasoning and argumentation (SRA) skills are fundamental to professional practice and research. Statistical literacy (SL) can be defined as the ability to critically reflect about statistics as evidence in arguments (Schield, 1999). As such, it is connected to scientific reasoning and argumentation skills (Fischer et al., 2014)which are the basis for evidence-based decision-making (Sedlmeier & Gigerenzer, 2001). Language proficiency in research is a further qualification for the researchers (Pang, Wong, Leung, & Coombes, 2019). Academic English with a unique set of rules to be explicit, formal, factual, objective and analytical in nature is essential for good academic writing (Rao, 2018).

Morale judgment is a timely attribute of the graduates for their performances. Strengthening practical moral competencies at work through systematic individual and organizational ethics training has been demonstrated to have many beneficial impacts on stakeholder performance and organizational effectiveness (Collins, 2012;Maggitti, 2015; Weber & Wasieleski, 2013). Managers want to have access to and use practical tools that develop moral competencies that add value to organizational performance. Some of the moral attributes have gained favors in universities, and these include ethical, moral and social responsibility, integrity, and cross-cultural awareness (Hill, Walkington, & France, 2016).Study by Mahdavikhou, Hossein, Moez, Khotanlou, & Karami, (2014) state that moral intelligence among employees such as integrity and responsibility can give a chain effect to ethical thinking and decision making and sequentially contributes to a better job performance. Today's business leaders face an unprecedented challenge of engaging and retaining young workers. In this vein commitment, loyalty and respect to the job outcome play important roles. Employees' perception of their organization's ethical climate is found to be related to job satisfaction, organizational commitment, and organizational performance(Kim & Miller, 2008; Pettijohn, Pettijohn, & Taylor, 2008). Also, higher employee commitment and loyalty are associated with enhanced workplace performance (Brown, McHardy, McNabb, Taylor, & Strategy, 2011).

Additionally, teamwork spirit is a prerequisite for professionalism. It involves building trusting relationships with customers and colleagues (Hansen & Hansen, 2010) and other skills such as listening, meeting deadlines, coordinating schedules, persuading, negotiating, questioning, and leading (Salford, 2015). Effective teamwork helps with efficient task completion, illuminates creative ideas or solutions to problems, elicits emotional support from group members, promotes the acquisition of interpersonal skills, and improves the outcome of a project through each team member's strengths (Hodgman, 2018).

Last but not the least, the desire to work for others without expecting any return is another attribute that a society expects from the graduates. The development of global outcomes, including global citizenship and active civic responsibility, permeates the ideology of volunteering, as volunteering offers an attractive way for students to build

their social and personal capital (Einfeld & Collins, 2008). Volunteers can have diverse motives- for example, wanting to make a difference and increasing employability outcomes (Rehberg, 2005).The act of volunteering within higher education offers more than a feel-good activity; rather, volunteering can be a vehicle to challenge awareness of social inequities, facilitate awareness beyond the university's reach and challenge students' existing ways of knowing (Holdsworth & Quinn, 2010). Previous research has shown that those who volunteer for altruistic reasons are more likely to devote more time and effort to an event (Handy et al., 2010).Since Bangladesh economy endures structural change, the employers also demand accordingly. In this vein a study explored that most employers placed the highest emphasize on communication and English language skills, followed by time management skills, and problem-solving skills. In contrast the students and recent graduates admitted their skill gap mostly in communication and English language skills, and numeracy and mathematical skills (Khatun et. al, 2022).

The above literature review indicates is missing a link where subject specific quality attributes are not discussed in the research domain. Moreover, many attributes are explored from the different stakeholders' perception but no attempt is made to quantify them using an index was evident in the literature. On top of that involving three categories of respondents is adding to the methodology gap of the existing research.

3. Methodology

The current study uses a combination of both qualitative and quantitative research methods. In phase I, exploratory method is used to identify higher education quality indicators. In phase II, the Higher Education Quality Index (HEQI)is constructed and quantified using a reflective measurement approach of Structural Equation Model.

Sources of Data

The study relies on a combination of primary and secondary data. Secondary data have been collected from credible research papers to validate the indicators of higher education quality to support the first phase of the study. Primary data for the study have been gathered through e-mail survey, from the target respondents, using semi-structured and structured questionnaires. According to a World Bank report, one of every three graduates remain unemployed in Bangladesh. That means,.–33 percent of the graduates are failing to get themselves fitting into the job market (Sarker, 2021). In Bangladesh, public universities are teaching majority of the students with diverse socio-economic background for a long time. In this study, Jagannath University economics graduates are taken as a case since the university is still young in comparison with other public universities and economics graduates work in a wide range of occupations and industries, often beyond the discipline. It was evident that the institution lags in providing practical training, industrial exposure and professional courses to its economics graduates (Zaman & Bhattacharjee, 2020).This study considers students from all first 8 batches consists of 560 students of the department who have completed their education until 1 year before the commencement of the study and who have already

entered into the job market. Considering the significance of education quality for finding suitable employment opportunities and also sustaining employment this study has made an attempt to assess the quality of their higher education.

Population and Sampling

Three sets of respondents are selected for data collection for the study. Firstly, stakeholders of the society are considered as the first set of respondents for the phase I analysis where the quality attributes of higher education have been identified. They are the representatives of different groups of the society namely, employers, academics, social and cultural activists, development professionals and Tech Experts to identify higher education quality indicators. A purposive sampling technique was applied to interview 20 respondents in this connection. They are selected based on their potential roles in their individual fields and the level of their dealings with the educated youth either directly or indirectly. The alumni of the department comprise the second set of respondents who will evaluate their own education quality attributes in the second phase of analysis. The third set of respondents comprises the respective employers of the economics graduates (second set of respondents) who will evaluate the education quality attributes of the employees being their immediate supervisors in the second phase as well.

The data consists of 100 pairs, each one is made of on employee (economics graduate) and the respective employer. The respondents are selected randomly from the young alumni (minimum 3 years and maximum 6 years from the date of graduation) of Jagannath University, Department of Economics, as the sample respondents. One immediate supervisor of each of the selected alumni has been taken to complete a single pair of evaluators. A purposive sampling technique was applied considering the availability of the respective employers, time and resource limitation of the study. Since a qualitative study is emphatic on relatively small and purposively selected sample as per Miles and Huberman (1994), to follow depth not breadth of understanding (Palinkas et al., 2015), this study opted for a purposive sampling in this phase.

The questionnaire was developed based on an extensive literature review and divided into two parts. The questionnaire for phase I of the study was to examine the perception of the key stakeholders of the society. The second phase questionnaire was to examine employee performance on selected higher education quality attributes validated from the responses of the employee themselves and their corresponding employers or supervisors. Both closed and open-ended questions comprise the survey instrument. The responses to the opinion-based questions are assessed using 5 -point Likert scale.

Conceptual Model of Data Collection

The definition of the indicators used to construct HEQI model (Figure 1) and the rationale of choosing these constructs are provided in the Appendix (Table A1). Each dimension in the HEQI is considered as a latent measurement or construct. Overall performance measurement of each employee by the corresponding employer is treated as the ultimate outcome variable. This new model estimates the weights of all indicators and constructs used in the conceptual model.

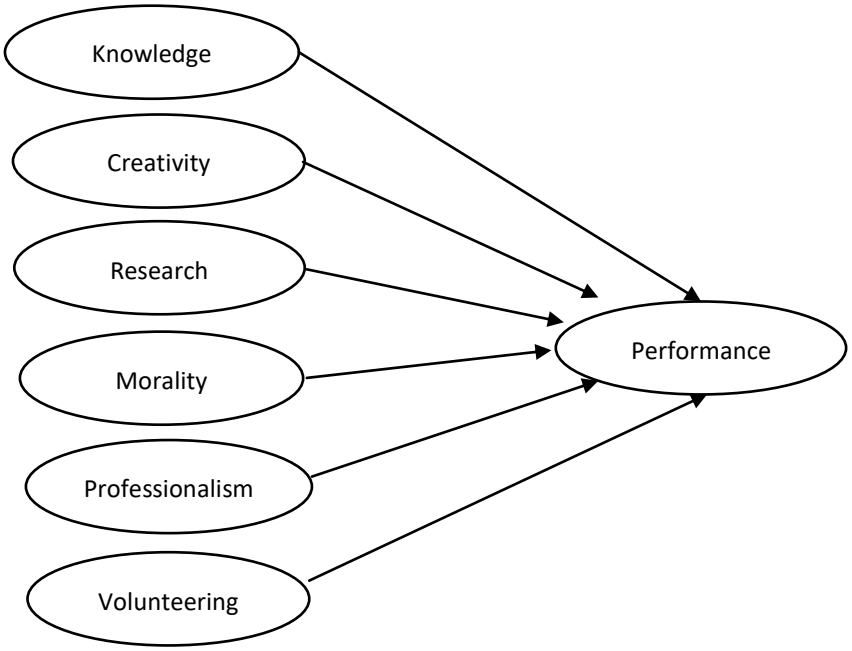

Figure 1: Conceptual Model of HEQI.

Statistical Techniques

The estimation technique is based on Structural Equation Modelling (Callingham & Watson). This is basically a multivariate estimation technique, that offers the benefits of principle component analysis (PCA) and multiple regression (Verleye, Ireton, Carrillo, & Hauspie, 2004; Wright, 1934). The SEM is enumerated in two stages. Firstly, the structure of the constructs and latent variables are detected using PCA. Later, combination of several possible models is examined to locate the best solution for explaining the inter linkages between the regressands and the regressors. This statistical computation is known as Partial Least Squares-Path Modeling (PLS-PM) (Wright, 1934).

The study has used several statistical packages to carry out this analysis. For data cleaning, coding and PCA it has used Statistical Package for Social Sciences (SPSS) version 22.0. Once the measurement model has been finalized, it used Smart-PLS version 2.0 to conduct the Partial Least Square-Structural Equation Modelling (PLS-SEM).

4. Data Analysis and Results

The data analysis pursues the objective of the study by interpreting the socio demographic features of the respondents and then analyzing the value of their HEQI. The socio-economic characteristics of the respondents (employee) are presented in Table A2, from which it is seen that out of 100 respondents, 84 were male and 16 were female. In terms of sector of employment, 97% were from service sector, and rest 3% were from the industrial sector. Respondents' level of occupation also varied, showing

that 39% were working at entry level, 35% at mid-level, and 26% at senior level in different organizations. With regard to level of income, major portion of respondents (32%) fell within the bracket of BDT 30,000-40,000 per month.

4.1 Partial Least Squares

PLS-SEM approach using Smart-PLS 2.0 have been performed to test the hypothesized research model. This was done via a two-step data analysis: measurement model and structural model.

4.1.1 Measurement Model

In constructing the measurement model, it is assumed that the constructs are reflective in nature. The claim was grounded on the widely recognized framework proposed by (Coltman, Devinney, Midgley, & Venaik, 2008) which is considered as a blueprint to decide between formative and reflective measurement models. Following that guideline, firstly from the theoretical point of view, items of each construct reflects a common theme and they are somewhat interchangeable. Secondly, all the items included under a particular construct are found to be interrelated as reflected by principal component analysis and factor analysis (see Table A3 and Table 1 for details). Therefore, the proposition of reflective measurement model of the study satisfies both theoretical and empirical conditions.

In the first stage of PLS-SEM approach, the study assessed the measurement model by examining the reliability and validity of the measures. This process is conducted by their reliability and convergent validity. Cronbach's α and composite reliability were used to evaluate the internal consistency and reliability of the construct measures. These statistics are reported in Table 1 which showed that all Cronbach's α and composite reliability surpassed the threshold value 0.70. These confirms that in terms of reliability all measures are rigorous (Hair, 2009). Following the recommendation of Fornell & Larcker, (1981)convergent validity was estimated by measuring the standardized factor loadings and average variance extracted (AVE). Convergent validity is satisfied when (i) all measurement items exceeds 0.70(Knowles et al., 2014), composite reliability is greater than 0.70, and (Knowles et al., 2014) AVE tops 0.50 (Fornell & Larcker, 1981; Hair, 2009).

4.1.2. Structural Model – Estimation of Indicator and Sub-Index Weights

Once the measurement model was finalized the study estimated the structural model at the second stage in the PLS-SEM approach. This process was done by estimating the path coefficients and corresponding normalized values. In this stage, all the constructs (sub-index) were considered as independent variables, while the performance of an employee was considered as the outcome variable. The statistical significance of the weights of the indicators and path coefficients were examined(Chin, 1998). The corresponding R^2 value for the structural model using reflective constructs is 0.81. The results indicate that the path coefficients running from the six constructs to the outcome variable were statistically significant (see Table 2). The direction of association was positive in all cases. This confirms the empirical validity of our hypothesized conceptual model.

Table 1: Standardized Factor Loadings, Average Variance Extracted, Composite Reliability, and Cronbach's α.

Item	Construct	Factor loading	AVE	Composite reliability	Cronbach's α
K2	Knowledge	0.808	0.631	0.901	0.806
K3		0.706			
K4		0.863			
K5		0.792			
C1	Creativity	0.771	0.664	0.855	0.748
C2		0.879			
C4		0.791			
R1	Research	0.898	0.934	0.936	0.861
R2		0.897			
R3		0.793			
R4		0.749			
M1	Morality	0.897	0.700	0.936	0.773
M2		0.835			
M3		0.727			
P1	Profession	0.886	0.693	0.870	0.780
P2		0.896			
P3		0.701			
V1	Volunteer	0.798	0.664	0.888	0.824
V2		0.783			
V3		0.858			
V4		0.818			
O1	Overall performance	0.785	0.524	0.867	0.830
O2		0.733			
O3		0.755			
O4		0.750			
O5		0.537			
O6		0.754			

Notes: 1) For an explanation of the 10 indicators see Table A1. 2) CR=Composite reliability; AVE = Average variance extracted.

The 21 HEQI indicators emanating from the PLS-based SEM using the constructs running from knowledge, creativity, research, morality, professionalism, and volunteering sub-indices to the HEQI stood at 0.54, 0.06, 0.19, 0.14, 0.12, and 0.12, respectively. The structural weights were found to be statistically significant. The relative contribution of an indicator to the corresponding construct (sub-index) and to the overall HEQI (aggregated weight) can be calculated from the regression weights reported in Table 2. For details explanation on how the standardized weights are calculated please see the notes appearing at the end of Table 2. As anticipated, knowledge explains a major portion (46%) of the variation of the outcome (HEQI) followed by research (around 16%). Morality contributes around 12% while professionalism and volunteering both captures around 10.5%. The least contribution is coming from creativity (marginally below 5%).

Table 2: Overall Contributions of the HEQI Indicators and Sub-Indices to the Overall Performance

Sub-index/indicator	Indicator weight	ECsub[1]	Path coefficient	ECHEQI[2]
Knowledge		**100.0**	**0.54***	**45.93**
K2	0.31*	25.1		11.54
K3	0.23*	18.5		8.51
K4	0.35*	27.7		12.71
K5	0.36*	28.7		13.17
Creativity		**100.0**	**0.06*****	**4.93**
C1	0.32*	26.2		1.29
C2	0.50*	40.8		2.01
C4	0.40*	33.0		1.63
Research		**100.0**	**0.19***	**15.96**
R1	0.40*	33.9		5.41
R2	0.35*	30.1		4.81
R3	0.21*	18.0		2.88
R4	0.21*	18.0		2.87
Morality		**100.0**	**0.14****	**12.21**
M1	0.54*	45.8		5.59
M2	0.42*	35.1		4.29
M3	0.23*	19.1		2.33
Profession		**100.0**	**0.12*****	**10.33**
P1	0.48*	40.7		4.20
P2	0.47*	40.6		4.19
P3	0.22*	18.8		1.94
Volunteer		**100.0**	**0.12****	**10.64**
V1	0.33*	26.8		2.85
V2	0.28*	23.2		2.46
V3	0.33*	27.2		2.89
V4	0.28*	22.9		2.44

Note: 1) ECsub = relative explanatory contribution of the indicator to the respective sub-index or construct of the HEQI = absolute indicator weight ÷ the sum of all absolute indicator weights of the respective sub-index; 2) ECHEQI = relative explanatory contribution of the indicator to the HEQI = (absolute indicator weight × the path coefficient running from the respective construct to the HEQI construct) ÷ by the aggregate of all HEQI path coefficients; and 3) *, **, *** denote significant at 1 per cent, 5 per cent and 10 per cent, respectively.

4.2. Summary Statistics and Assessment of HEQI Scores

The HEQI scores for all respondents' range from 62.71 to 100 with a mean value of 84.74 and a median value of 84.62 (see panel 1 of Table 3). These figures indicate that the deviation of HEQI scores by 15.78 points (considering 100 highest possible values). Summary statistics were also decomposed across all six sub-indices and reported

accordingly in Table 3. The highest variation between maximum and minimum score was observed for knowledge sub-index (25.40 points). The study conducted a two-step cluster analysis to identify whether there are variations in HEQI and sub-indices scores across different clusters. This process identified three clusters. The variation in descriptive statistics across all three clusters is tabulated in the panels 2-4 of Table 3. It is evident from the results that the HEQI score of cluster 1 (94.75 points) is much higher than that of the overall scores combining all respondents as well as remaining two other clusters.

Table 3: Overall Summary Statistics of HEQI and Sub-Indices.

Descriptive Statistics	**N**	**Mean**	**Median**	**Min**	**Max**	**Range**	**SD**
Panel 1: All							
HEQI	100	84.74	84.62	62.71	100.00	37.29	8.31
Knowledge sub-index		38.12	38.40	20.60	46.00	25.40	5.26
Creativity sub-index		4.14	4.20	3.00	5.00	2.00	0.53
Research sub-index		12.36	12.80	6.40	16.00	9.60	1.88
Morality sub-index		11.34	11.40	9.00	12.20	3.20	0.97
Profession sub-index		9.95	10.40	6.80	10.40	3.60	0.81
Volunteer sub-index		9.02	9.00	5.40	10.60	5.20	1.25
Panel 2: Cluster 1							
HEQI	27	95.03	94.75	90.43	100.00	9.57	2.62
Knowledge sub-index		44.05	44.20	40.80	46.00	5.20	1.88
Creativity sub-index		4.64	4.60	4.00	5.00	1.00	0.33
Research sub-index		14.16	13.60	12.00	16.00	4.00	1.13
Morality sub-index		11.99	12.20	10.60	12.20	1.60	0.48
Profession sub-index		10.37	10.40	9.60	10.40	0.80	0.15
Volunteer sub-index		10.07	10.60	8.60	10.60	2.00	0.72
Panel 3: Cluster 2							
HEQI	44	85.12	84.78	79.99	89.76	9.77	2.86
Knowledge sub-index		38.38	38.40	31.60	44.20	12.60	2.45
Creativity sub-index		4.15	4.20	3.20	5.00	1.80	0.40
Research sub-index		12.29	12.80	6.40	16.00	9.60	1.64
Morality sub-index		11.36	11.40	9.80	12.20	2.40	0.91
Profession sub-index		10.16	10.40	8.20	10.40	2.20	0.50
Volunteer sub-index		9.02	9.00	6.40	10.60	4.20	0.97
Panel 4: Cluster 3							
HEQI	29	74.59	75.69	62.71	79.13	16.42	4.03
Knowledge sub-index		32.21	31.80	20.60	38.40	17.80	3.88
Creativity sub-index		3.66	3.60	3.00	4.20	1.20	0.42
Research sub-index		10.79	10.40	8.00	12.80	4.80	1.24
Morality sub-index		10.71	10.60	9.00	12.20	3.20	1.02
Profession sub-index		9.24	9.60	6.80	10.40	3.60	1.06
Volunteer sub-index		8.06	8.00	5.40	10.60	5.20	1.26

The variation of HEQI scores were also arrayed using demographic characteristics of the respondents (Table 4). Interestingly, there prevails gender-wise variation in HEQI scores among graduates. Besides, it is evident from the findings that the HEQI scores improve as the graduates become more experienced. The median score of HEQI is much higher for graduates working as a senior level executive. Results also demonstrate that the higher the experience, the greater the HEQI score.

Table 4: Demographic Characteristics and Variation in HEQI Scores.

Demographic characteristics	**Mean**	**Median**	**Min**	**Max**
Batch				
-1st	85.60	85.70	66.80	100.00
-2nd	84.80	86.70	70.70	96.80
-3rd	84.60	87.20	62.70	94.30
-4th	83.00	81.30	70.70	100.00
-5th	88.60	87.60	74.70	99.70
-6th	83.40	84.80	68.80	96.10
-7th	69.30	69.30	69.30	69.30
-8th	84.80	83.30	78.00	94.80
Gender				
-Male	85.20	84.60	62.70	100.00
-Female	82.10	84.30	66.80	92.00
Occupation sector				
-Agriculture	0.00	0.00	0.00	0.00
-Industry	85.50	86.30	75.70	94.50
-Service	84.70	84.50	62.70	100.00
Occupation level				
-Entry level (0-3 years)	83.60	83.60	62.70	99.70
-Mid-level (3-5 years)	85.00	84.00	70.70	100.00
-Senior Level (>5 years)	86.10	86.10	72.00	98.10
Income level				
-10,000TK- 20,000TK	86.00	86.70	66.80	96.40
-20,000TK -30,000 TK	81.60	78.00	62.70	96.80
-30,000TK-40,000 TK	86.50	86.80	69.30	100.00
-40,000TK -50,000 TK	84.90	83.80	68.80	100.00
-more than 50,000TK	83.90	84.40	74.70	94.80
Present work experience				
- less than 1 year	80.90	80.80	66.80	98.70
-1-2 years	84.40	84.40	62.70	96.70
-2-3 years	83.80	83.60	68.80	100.00
- greater than 3 years	86.00	85.50	70.70	100.00

5. Discussion

The HEQI scores are found to be ranging from 62.71 to 100 for all the respondents with a mean value of 84.74 and a median value of 84.62 by the study. Among various factors of higher education, the study was emphatic respectively on knowledge, research, morality, professionalism, volunteering activities and creativity to be effective to influence the quality of higher education as demanded by the market. Accordingly, it was found that knowledge explained a major portion (46%) of the variation of the outcomes (HEQI).A similar study by Ramirez et al. (2014) noted that the graduates claimed their knowledge, academic acquired skills and competencies contributed greatly in their job performance (Ramirez, Cruz, & Alcantara, 2014). The study further found that research contributes education quality index positively by around 16 %. Study by Bandaranaike & Willison (2015) found a positive link between research skill andemployability of the graduates. Additionally, another study also validated the association of research with critical thinking and problem solving at the workplaces of those who become employed graduates (Willison, Sabir, & Thomas, 2017; Wilmore & Willison, 2016). Among other explanatory variables morality was found to be contributing HEQI around 12% in the study. It resembles other studies where interpersonal skills are valued far more than any other skills, and that personal ethics, the qualities of honesty, integrity and trust are expected at the time of appointment (Hinchliffe and Jolly, 2011). The study further found that, professionalism captures 10.5 % of the performance of the HEQI. Comparable study on professionalism also highlights that, higher commitment and loyalty are associated with enhanced workplace performance (Brown, McHardy, McNabb, Taylor, & Strategy, 2011).Moreover, respectful engagement and autonomous respect on job outcomes ultimately ensures positive long-term business benefits (LaGree, Houston, Duffy, & Shin, 2021).

Volunteering, another factor of higher education quality in this study captures around 10.5% of the variation in the performance of HEQI. This is validated by other findings about the scope of volunteering in human capital. Accordingly, it is claimed by some studies that, volunteering helps with the maintenance and/or development of job specific or 'hard' skills (Hirst, 2001; Cook and Jackson, 2006). It has also been found to help with softer skills, such as teamwork and communication (see for example v, 2011). Volunteering may help with the development of 'work attitudes' and 'behaviors' (Krahn et al., 2002), more broadly to the acquisition of human capital, and also, generally, in the growth in confidence and self-esteem (Williams, 2001).

The least contribution of the factors of HEQI is coming from creativity (marginally below 5%). The International Labor Organization identifies creativity as one of the main skills needed in modern life and emphasizes the need of the development of creativity as part of its integration into the process of academic education and professional training (ILO, 2013). Since it was observed that in the context of higher education, creativity is considered as an integrative property, the key characteristics of which are the ability to produce original ideas, result-orientation, solution of practical problems, originality and speed of thinking, openness to new experience, and tolerance for uncertainty (Matraeva, et al., 2019).

6. Conclusion and Recommendation

From the Jagannath university case study, it is vivid that higher education quality in Bangladesh has ample scope to improve. This study unfolded the factors which construct higher education quality in the context of Bangladesh. With the help of these factors the Higher Education Quality Index (HEQI) has been constructed. The HEQI scores are found to be ranging from 62.71 to 100 for all the respondents with a mean value of 84.74 and a median value of 84.62. Among various factors the study was emphatic respectively on knowledge, research, morality, professionalism, volunteering activities and creativity to be effective to influence the quality of higher education as demanded by the employers. The study further conducted a cluster analysis to identify whether there are variations in HEQI and sub-indices scores across different clusters. This process identified three clusters. It is evident from the results that the HEQI score of cluster 1 of 27 respondents (95.03 points) is much higher than that of Cluster 2 of 44 respondents (85.12 points) and Cluster 3 of 29 respondents (74.59 points). The study can be validated on the points that all three clusters are showing identical sequential significances of the factors on HEQI. The study also arrayed the variation of HEQI scores using demographic characteristics. It was observed that male respondents are ahead of female respondents in higher education quality. The occupation level and work experiences showed a consistent relationship with the HEQI. The higher the occupation level and work experience the higher the value of the index of higher education quality is found.

While educated youth unemployment is a concern for the country, the study is rightly showing that we have large room to improve the quality of higher education further by addressing the market demand. Since Bangladesh can enjoy the demographic dividend, it is high time to shape our policies to address the factors which may contribute to quality higher education in the country. Accordingly, the following recommendations are offered by this study:

Firstly, to address the vision 2021, Agenda 2030 and Vision 2041, the role of socially engaged youth cannot be overemphasized. For instance, socially engaged universities are paramount to the necessity of knowledge creation. The education institutions may accept community engagement practices as essential, both as a way to share those efforts currently being executed by them, and to face the challenges of the future. Secondly, to make the national economy more knowledge driven, unfolding research opportunities are a must at the higher education institutions. A close intertwining of teaching and research strengthens their identity. Academics can help students by engaging them in research to better develop highly valued competencies. Thirdly, establishing moral fabric is a prerequisite of quality education. It is essential that as part of the pedagogical practices, schools must educate their students for the decision-making process, creating consensus based on universal values. Therefore, bioethical education becomes more important and should integrate the discussion of trans-subjective morality criteria, like rationality interconnected with impartiality, among others.

Fourthly, this study finds professionalism as a crucial quality of employability. The efforts needed to improve professional skills are academic research, written and oral communication, management, equality and diversity, commercial awareness, advocacy

and leadership (supervision of trainees and others). A similar need for "non-technical" skills is also demanded by many professions where there have been numerous calls to develop teamwork and communication skills, commercial and technological awareness, and the capacity for lifelong learning. Finally, as the global economy changes and new social challenges arise, the graduates of tomorrow will need to be creative thinkers with multidisciplinary skill sets. Fostering student creativity is vital to the university's research successes and a natural next step for an institution with roots in traditional science teaching. The universities should install educational strategies to motivate students towards creativity. Higher level national and international monitoring units of the universities should ensure that these 21st century skills of the students are properly nurtured at the university level to make them fit for the growing demand of the market. In this regard innovative measures like class presentations of students on topics outside curriculum, open discussions between students, annual creativity competition at both faculty and university level to solve real-world problems etc. should be organized by the universities. In this venture universities should further continue to expand their collaborations with regional and international industry partners, always keeping student creativity in mind. Also, internship or coop opportunities could really help prepare the students better before getting into the job market.

This study can be a leeway to have a national index for higher education involving all the public and private universities of the country and thus may guide the educational institutions to the right track. This may help the nation to reach its targets by turning its large active age-group population from the status of burden to the status of resource.

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Appendix

Table A1: Description of the variables in the conceptual model.

Construct/Indicator	Question/Item
Knowledge (K)	
K2. Digital skills	How competent are you in using technological devices?
K3. Problem solving	How capable are you in solving professional problems?
K4. Knowledge update	Evaluate the extent of your updated knowledge.
K5. Interdisciplinary skill	How to you evaluate your interdisciplinary skill?
Creativity (C)	
C1. Innovative capacity	How innovative do you think you are?
C2. Out-of-the-box thinking	How can you think out of the box?
C4. Eagerness to learn	How eagerly do you learn new things?
Research (R)	
R1. Basic knowledge	What is the level of your necessary knowledge in conducting a research?
R2. Elementary statistical skill	Evaluate the level of your elementary statistical knowledge for conducting research.
R3. Data interpretation skill	How capable are you in interpreting information and data?
R4.linguistic knowledge	Evaluate your linguistic knowledge in Bengali and English?
Morality (M)	
M1. Truthfulness	How do you practice truthfulness?
M2. Honesty	What is your level of honesty?
M3. Social responsibility	How do you show your social responsibility?
Profession (P)	
P1. Commitment	What is your level of commitment to the organization?
P2. Loyalty	How loyal are you to the organization?
P3. Respectfulness	How respectful are you to your own profession?
Volunteer (V)	
V1. Social service	How much are you involved in social service-related activities?
V2. Citizenship spirit	To what extent do you hold citizenship spirit?
V3. Social awareness	To what extent do you think you are concerned for the society?
V4. Social responsibility	To what level do you bare social responsibility?
Outcome/ Performance of employee (O)	
O1. Knowledge	Evaluate the subject knowledge of your employee.
O2. Creativity	How innovative is your employee?
O3. Research	Evaluate the elementary statistical knowledge of your employee.
O4. Morality	What is his level of honesty?
O5. Professionalism	How capable is your employee in professional dealing with his / her colleagues?
O6. Volunteering	How much does your employee is involved in social service activities?

Table A2: Rotated component matrix.

Item	Component						
	1	**2**	**3**	**4**	**5**	**6**	**7**
K2	0.733						
K3	0.680						
K4	0.888						
K5	0.629						
C1		0.556					
C2		0.501					
C4		0.567					
R1			0.826				
R2			0.857				
R3			0.892				
R4			0.711				
M1					0.787		
M2					0.850		
M3					0.792		
P1						0.717	
P2						0.859	
P3						0.664	
V1				0.771			
V2				0.706			
V3				0.883			
V4				0.637			
O1							0.727
O2							0.859
O3							0.732
O4							0.806
O5							0.765
O6							0.829
Kaiser-Meyer-Olkin Measure of Sampling Adequacy					0.828		
Bartlett's Test of Sphericity		Approx. Chi-Square			1314.678		
		df			325		
		Sig.			0.000		