

EMPOWERING EMPLOYABILITY POTENTIAL: THE TRANSFORMATIVE IMPACT OF EXTRACURRICULAR ENGAGEMENT ON HARD AND SOFT SKILL DEVELOPMENT AMONG UNIVERSITY STUDENTS-A WILCOXON ANALYSIS

Md. Shawfiqul Islam¹, Shahed Mahmud² and Md. Sakib Hossain³

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Abstract

This study investigates the impact of participation in structured extracurricular activities (ECA) on the development of hard and soft skills among university students in Bangladesh. A pre-post intervention design was employed with 150 active ECA participants from five universities, assessing ten skill domains: public speaking, leadership, teamwork, event organization, problem-solving, career goal clarity, networking, Microsoft tools proficiency, ECA engagement, and time management. Data were collected using a 50-item questionnaire at baseline and after one year of structured participation. The Shapiro-Wilk test confirmed non-normal data distributions, making the Wilcoxon signed-rank test the appropriate analytical method. The questionnaire demonstrated high reliability, with Cronbach's alpha values ranging from 0.883 to 0.901. Results revealed statistically significant improvements across all ten skill domains ($z = 6.17-9.11$; $p < .001$). The greatest gains were observed in public speaking (mean improvement = 1.27), event organization (1.21), and networking (1.20). These findings provide robust empirical evidence that structured ECAs enhance students' skill development, persistence, and career readiness, aligning with the predictions of Social Cognitive Theory and the Job Demands-Resources Model.

Keywords: ECA, Employability, Higher Education, Skill development, Wilcoxon signed-rank test.

1. Introduction

Experiences that equip graduates with technical know-how and strong interpersonal and workplace skills are becoming crucial in the current job market (Aryani et al.,

¹ Assistant Professor, Department of Management Studies, Jagannath University,  <https://orcid.org/0009-0006-4731-2898>, Email: shawfiqul@mgt.jnu.ac.bd

² Research Assistant, Department of Finance, Jagannath University,  <https://orcid.org/0009-0005-1032-3115>, Email: b200203021@fin.jnu.ac.bd

³ Research Assistant, Department of Sociology, Jagannath University,  <https://orcid.org/0009-0005-3769-4004>, Email: b200404079@soc.jnu.ac.bd

2021; López-Carril et al., 2025). Skills like communication expertise, leadership ability, willingness to collaborate, and critical thinking are increasingly desired by employers (Chukhlomin & Vernon, 2024). This phenomenon resulted in mounting pressure on higher education institutions worldwide to deliver academic knowledge while providing students with multidimensional skill sets and meeting the expectations of graduates entering a contemporary workforce (Chukhlomin & Vernon, 2024). Extracurricular activities were found to be the most effective mechanisms to resolve these institutional challenges (Jackson et al., 2024; Peng, 2023).

ECA, defined as student clubs, career-specific societies, and co-curricular schemes, has evolved to be channels through which university students hone a blend of hard and soft skills in real-world environments (Kumari, 2024; Samuel, 2024). ECA promotes interactive learning by giving students opportunities to lead, work collaboratively on projects, give public presentations, and manage events, which account for skill development and self-efficacy (Peck et al., 2016). Again, considerable evidence from both developed and developing country contexts found links between higher rates of ECA participation and better employability, increased professional self-confidence, and improved readiness to enter the workforce (Kuh, G. D., 2008; Nguyen et al., 2020).

For Bangladesh, examining this relationship is essential. The conventional academic curriculum of universities in Bangladesh tends to concentrate on theoretical knowledge rather than practical competencies (Shibli, 2024), resulting in a mismatch between graduates' skills and industry demands. In this context, student clubs and career-oriented ECAs emerged as a significant informal mechanism to bridge this skills gap (Crew, 2024).

Despite empirical evidence of the possibility and widespread acknowledgement of ECAs, investigations on their effectiveness, especially in the context of higher education in Bangladesh, are minimal. Most of the studies done to date are descriptive. Existing studies have primarily focused on specific skill sets (Eccles & Barber, 1999; Peck et al., 2016) within Western educational contexts, limiting the generalizability of their findings (Cortellazzo et al., 2021). Therefore, there is a pressing need for pre-post intervention studies that examine changes in skills domains using robust statistical methods.

1.1 Statement of the Problem

The employability gap is a global phenomenon, coupled with a mismatch of soft skills and practical experience among university graduates, resulting in huge underemployment (Shibli, 2024; Wahab, 2025). Like other developing countries, in Bangladesh as well, the gap between qualifications and competencies has resulted in a structural employability deficit where many university graduates get their degrees, but they are inadequately ready to work (Wahab, 2025).

The traditional curricula are mainly philosophical and offer almost no chance to instil applied competencies such as speaking, scheduling an event, networking, or transferring digital knowledge (Shibli, 2024). Therefore, this misalignment creates an excess supply of graduates with high levels of education and inadequate skill

development who find themselves unable to meet even elementary occupational needs (Shibli, 2024). Although participation in ECA has been suggested as a possible solution, no empirical studies have examined the effects of ECA participation comprehensively across different skills domains using pre-post longitudinal designs, specifically in developing country universities (Cortellazzo et al., 2021; Eccles & Barber, 1999).

1.2 Objective of the Study

The purpose of this study is to evaluate the effects of one-year participation in structured ECA programs across ten skill domains, such as public speaking, leadership, teamwork, event organization, problem-solving, career goal clarity, networking, Microsoft tools proficiency, extracurricular activities participation, and time management among Bangladeshi university students. The specific objectives are:

- a) to establish baseline levels of skills in the year before ECA participation;
- b) to identify post-assessment skill levels after one year of active participation;
- c) to undertake a statistical assessment of changes over time through the Wilcoxon signed-rank test with effect sizes for all outcome measures; and
- d) to evaluate the construct validity and reliability of the measurement instrument through exploratory factor analysis and Cronbach's alpha.

2. Literature Review

2.1 Theoretical Framework

This study is grounded in Social Cognitive Theory (SCT) and the Job Demands-Resources (JDR) Model, both of which provide a solid conceptual framework to support our understanding of how ECA participation facilitates skill development. The SCT was developed by Bandura (2001), who proposed that the interaction of personal cognitive factors, behavioral patterns, and environmental influences drives learning. Self-efficacy and confidence in one's ability to perform the behaviors necessary for producing a particular effect are fundamental concepts central to SCT, making it especially pertinent to ECA contexts where students frequently face challenges involving performance (Fourie & Schlebusch, 2024; Nabavi, R., & Bijandi, M., 2012). In ECA environments, students can observe and practice with more experienced peers or through guided mentorship, all of which are fundamental mechanisms of the SCT model (Bembenutty et al., 2016). Furthermore, empirical research has validated that students' problem-solving ability and critical thinking skills are significantly increased by SCT-based interventions (Almulla & Al-Rahmi, 2023).

Bakker & Demerouti (2017) developed the JD-R model, which was initially developed in an occupational context, but it has been applied to the educational domain as well, where academic challenges are demands and institutional resources that buffer motivations (Alzahrani et al., 2020; Barbayannis et al., 2022). The model describes a health impairment pathway in which unmitigated demands directly result in burnout and a motivational path (Alzahrani et al., 2020) in which sufficient levels

of resources facilitate engagement, leading to performance (Bakker & Demerouti, 2017). In the context of education, ECA activities provide them with practical skills, social support systems, and autonomy, thus increasing academic engagement and career preparedness (Lesener et al., 2020; Schaufeli & Taris, 2014). However, Akkermans et al. (2013) found that career competencies derived from resource-building activities mediate the relationship between job resources and positive career outcomes, thus reinforcing the suitability of JD-R to extracurricular skill development.

2.2 Empirical Evidence

Previous research has consistently demonstrated the positive impact of extracurricular activities (ECAs) on student development. Astin (1999) found that active participation in ECAs leads to measurable improvements in cognitive, social, and occupational outcomes. Building on this, Kuh, G. D. (2008) reported that participation in high-impact educational practices, including student organizations, yields significant and lasting benefits for student learning and career preparation. Similarly, Peck et al. (2016) found that students engaged in co-curricular activities exhibited significantly higher soft skill scores than their non-participating peers.

Evidence from developed nations showed that students engaged in different ECAs made significant progress in social and emotional skills (Cortellazzo et al., 2021). Based on a comparative study of Vietnamese undergraduates, the authors found that official student clubs played an important role by improving multiple types of skills possessed by these students compared with their non-participating counterparts (Nguyen et al., 2020). Longitudinal findings from Mahoney et al. (2003) confirmed that ECA participation in higher education has long-lasting effects on interpersonal competence and academic performance, whereas Hayes (2014) specifically reported a significant enhancement of other pertinent skills relevant for academic and career outcomes among students actively engaged in multiple ECAs.

Teamwork skills, such as team-based decision-making, adaptability, and steps to handle conflicts with fellow team members, are consistently identified among the top-ranked attributes desired by employers and can be impacted through both academic and extracurricular activities (Hisyam Mohd. Hashim, 2015). Problem-solving skills are one of the most universal predictors of employment, with quantitative associations both to hiring decisions and positive workplace performance (Villegas, 2024). Event organization abilities are indicative of a competent project manager, which is an attribute directly nurtured through practical ECA involvement (Anufrieva et al., 2021).

Time management skills of scheduling, prioritizing, and self-regulation have been shown with meta-analytic data to reduce stress and improve productivity, thereby enhancing the attractiveness of a person in the eyes of future employers (Aeon et al., 2021). Microsoft Office skills are a minimum technical requirement for jobs in many sectors, while being one of the few differentiators between recent graduates when competing for roles (Hoedemakers et al., 2023). Networking is also another one of the most powerful predictors of career path, as it provides access to the hidden job market and helps build long-term professional relationships (Hurst & Good, 2010).

The experience of participating itself is the aggregate experiential impact of involvement in student organizations and has been associated with increased social competence, personal development, and professional identity development (Astin, 1999; Fredrickson, 2004). Within the Bangladeshi higher education context specifically, perceived organizational support has likewise been shown to strengthen organizational commitment and work satisfaction, lending further contextual support to the JD-R resource-building pathway examined in this study (Islam, 2024).

2.3 Research Gaps and Hypotheses

This study addresses the following gaps by providing empirical evidence on the effectiveness of structured ECA participation in Bangladeshi universities, examining multiple skill domains simultaneously, and applying robust statistical methods within a pre-post longitudinal design grounded in SCT and JD-R.

Table 1: Literature Summary and Research Gaps

Reference	Research Gap Identified	Supporting Evidence
(Cortellazzo et al., 2021)	Geographical Limitations in a Developing Country Context: Limited comprehensive ECA skill development research in developing nations	High-quality studies predominantly from Europe/North America; comprehensive skill development research remains inadequate in developing-country contexts.
(Eccles & Barber, 1999)	Methodological Limitations: Absence of rigorous pre-post intervention studies on student skill development	Extant reviews note many descriptive and correlational designs with few true pre-post designs in higher education extracurricular research.
(Chughtai, 2019; Ibrahim & Devesh, 2019; Northouse, 2019).	Comprehensive Multi-Skill Assessment Gap: Lack of studies examining all skill domains simultaneously	Prior work often measures 2–3 outcomes rather than comprehensively assessing broad competency portfolios across many domains.
(Schaufeli & Taris, 2014)	Theoretical Framework Gap- 1: Limited application of the JD-R model to student skill development in developing nations	JD-R is primarily applied in occupational research; applications in educational/extracurricular settings in developing countries remain scarce
(Hair et al., 2019)	Theoretical Framework Gap 2: Absence of the SCT application in comprehensive skill	SCT guides numerous education studies internationally; studies overtly integrating SCT measurement with ECA

	development programs in developing nations	interventions in developing-country universities are scarce
(Mahoney et al., 2003)	Longitudinal Assessment Limitations: Lack of one-year longitudinal studies tracking skill development in Bangladesh	Western longitudinal studies confirm ECA participation leads to interpersonal competence; replication in Bangladeshi higher education contexts is needed.

Source: Compiled by authors

Based on the literature, the following hypotheses were formulated:

***H₁:** Participation in ECA significantly improves students' competency levels across all measured domains.*

***H_{1a}:** Participation in ECA significantly enhances public speaking skills.*

***H_{1b}:** Participation in ECA significantly enhances leadership abilities.*

***H_{1c}:** Participation in ECA significantly improves teamwork competencies.*

***H_{1d}:** Participation in ECA significantly improves event organizing skills.*

***H_{1e}:** Participation in ECA significantly enhances problem-solving abilities.*

***H_{1f}:** Participation in ECA significantly increases career goal clarity.*

***H_{1g}:** Participation in ECA significantly improves networking skills.*

***H_{1h}:** Participation in ECA significantly enhances proficiency in Microsoft tools.*

***H_{1i}:** Participation in ECA significantly increases extracurricular engagement.*

***H_{1j}:** Participation in ECA significantly improves time management skills.*

3. Methodology

3.1 Research Design

This study follows a single-group pre–post intervention design (longitudinal within-subjects, on two occasions before and after the one-year ECA program. This design lends itself to assessing the effects of structured experiential programs when random allocation is not achievable, as is often the case in naturalistic education (Fabrigar et al., 1999; Whitley & Ball, 2002).

3.2 Population and Sampling

The study population comprised students affiliated with career development organizations at five universities in Bangladesh. Owing to the voluntary and naturalistic nature of ECA participation, convenience sampling was adopted, resulting in 300 participants at the pre-assessment stage. Following a one-year intervention period, 150 participants completed both assessment waves, yielding a final analytical sample of $N = 150$. Convenience sampling was selected because probability sampling was impractical given the voluntary nature of participation and resource constraints. Also, this approach is widely accepted in similar research contexts (Stratton, 2021). Moreover, the final sample size was adequate for the analyses performed, as evidenced by strong sampling adequacy and satisfactory measurement quality, reflected in the high KMO value and acceptable factor loadings (MacCallum et al., 1999).

Table 2: Sample Characteristics

Characteristic	Category & Range	Sample	Percentage
Total sample		150	100
Sex	Male	83	55.3
	Female	67	44.7
Monthly student income (BDT)	0–3,000	0	0.0
	3,000–6,000	119	79.3
	6,000–9,000	31	20.7
	Above 9,000	0	0.0
Age at pre-assessment	18–20 years	150	100
Age at post-assessment	20–22 years	150	100

Source: Compiled by authors

The reduction in the sample from 300 to 150 participants warrants methodological clarification. Attrition occurred for two primary reasons. Participants who discontinued club membership and were no longer engaged in ECAs at the post-assessment stage, and survey non-response among participants who remained active. Consequently, the final analytical sample comprised students who sustained ECA participation for at least one year and completed both assessment waves. Although the attrition rate was 50%, comparable levels are common in longitudinal studies involving voluntary participation and extended follow-up periods (Hayes, 2014; Mahoney et al., 2003).

3.3 Data Collection Procedures

3.3.1 Pre-Assessment Phase: Baseline data were obtained at the time of recruitment to the ECA organizations, before any formal training or programming activities. The administered questionnaire (printed copy) was used in all five universities. Distribution and collection were facilitated by club volunteers at each university. All baseline identifiers, as a prerequisite for longitudinal follow-up, were documented. Each of the participating clubs organized structured programmatic activities for the one-year ECA intervention. ECA programming was standardized across five universities by implementing a common set of structured activities, including case competitions, skill-development boot camps, and member development sessions, to ensure comparable student engagement and capacity-building opportunities. Engagements were conducted using a variety of modalities, including in-person workshops, online sessions, and blended learning formats, covering all 10 skill domains assessed. During the intervention period, each university had club coordinators who monitored participation and engagement. Prior work suggests that while surface implementation may differ between institutional contexts, program fidelity can be preserved through common, comprehensive multi-skill assessment gap structural elements from high- and low-resource settings (Cortellazzo et al., 2021; Mahoney et al., 2003).

3.3.2 Post-Assessment Phase: The follow-up data were collected 1 year after the baseline using the same 50-item instrument under comparable conditions. University name, club name, student ID, phone number, and email address were used to track individual participants and match pre-post data accurately. Club volunteers were requested to contact their active members who previously identified as prior survey respondents by student ID to take the follow-up questionnaire. Participants' identifying information was only used for record-matching and will be destroyed after the research ends.

3.4 Instruments

Competencies were measured using a 50-item instrument covering ten domains, with five items allocated to each domain. All items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The assessed domains were public speaking, leadership, teamwork, event organization, problem-solving, career goal clarity, networking, Microsoft tools proficiency, ECA participation, and time management. Content validity was established through expert review by a panel of faculty members and career development professionals, who evaluated each item for clarity, relevance, and construct alignment. A pilot study involving a small group of students was subsequently conducted to assess item comprehension and preliminary internal consistency.

3.5 Data Analysis Framework

The data analysis stage followed a three-step sequence. EFA with principal-factor extraction method and ProMax rotation: EFA was performed on the 50 pre-assessment items to assess the construct validity of the measurement instrument (Fabrigar et al., 1999; Hair et al., 2019). As a measure of sampling adequacy to test the factorability of the correlation matrix, we used KMO and Bartlett's test (Hair et al., 2019; Kaiser, 1974).

Secondly, for each of the ten subscales, Cronbach's alpha was calculated as an index of internal consistency and reliability, with values ≥ 0.70 being the conventional cut-off for acceptable reliability in social science research (Hair et al., 2019). For all 20 variables, pre and post-assessment measures for each of the ten skill domains were applied, and the Shapiro-Wilk test was applied, along with statistics like the paired t-test (Shapiro & Wilk, 1965), to formally verify distributional normality.

Lastly, the Wilcoxon signed-rank test (Wilcoxon, 1945) was applied to each of the ten paired skill variables to assess pre-post improvements. The test provides signed ranks of the absolute differences between paired observations with a test for whether the median difference is different from zero, and can thus be well applied for analyses of pre-post intervention studies in non-normally distributed or ordinal data (Wilcoxon, 1945).

3.6 Ethical Considerations

Participants joined this study voluntarily and were informed about the study's purpose, procedures, possible benefits, and potential risks before data collection began. Their information was kept confidential, used only for record-keeping purposes, and will be securely destroyed after the completion of the study.

4. Results and Discussions

4.1 Descriptive Statistics

Descriptive statistics for all ten skill domains at pre- and post-assessment are presented in Table 3. Networking (M = 2.82, SD = 1.16), public speaking (M = 2.93, SD = 1.18), and event organization (M = 2.96, SD = 1.20) had the lowest pre-assessment means and indicated areas with the highest initial skill deficit and thus the most potential for development in participants through participation in service learning activities versus other domains of practice which may be more highly developed initially as identified by their higher pre-assessment means scores across both cohorts representing an area less likely to see significant levels of improvement through this type of training activity (Fredricks & Eccles, 2006).

Table 3: Descriptive Statistics

Variable	N	Mean	SD	Median	Min	Max
pubspk1 (Pre)	150	2.93	1.18	3.00	1	5
ldr1 (Pre)		3.15	0.99	3.00		
team1 (Pre)		3.60	1.06	4.00		
orgevnt1 (Pre)		2.96	1.20	3.00		
slvprb1 (Pre)		3.27	0.97	3.00		
clrgoal1 (Pre)		3.43	1.06	3.50		
ntwrk1 (Pre)		2.82	1.16	3.00		
ms1 (Pre)		3.13	1.21	3.00		
ec1 (Pre)		3.29	1.25	3.50		
timemgt1 (Pre)		3.43	1.10	4.00		
pubspk2 (Post)		4.19	0.78	4.00		
ldr2 (Post)		4.19	0.80	4.00		
team2 (Post)		4.41	0.70	4.00		
orgevnt2 (Post)		4.17	0.81	4.00		
slvprb2 (Post)		4.13	0.72	4.00		
clrgoal2 (Post)		4.03	0.88	4.00		
ntwrk2 (Post)		4.02	0.78	4.00		
ms2 (Post)		4.12	0.75	4.00		
ec2 (Post)		4.13	0.77	4.00		
timemgt2 (Post)		4.24	0.79	4.00		

Source: Findings based on survey data analysis

Note. Pre: pre-assessment; Post: post-assessment; Pubspk: Public Speaking; ldr: Leadership; team: Teamwork; orgevnt: Organizing Events; slvprb: Problem Solving; clrgoal: Career Goal Clarity; ntwrk: Networking; ms: Microsoft Tools Skills; ec: Extracurricular; Engagement; timemgt: Time Management.

All ten post-assessment means significantly improved following one year of ECA engagement, ranging from $M = 4.02$ to $M = 4.41$. As the decrease in standard deviations from pre-assessment to the post-assessment across all domains indicates greater homogeneity of participant performance after participating in an ECA, this suggests that these programs were most effective for initially lower-skilled participants.

4.2 Measurement Model

Before hypothesis testing, 50 Pre-Assessment items were factor analyzed using EFA with principal-factor extraction and ProMax rotation methods. The analysis confirmed the hypothesized 10-factor structure with ten factors combining to explain approximately 72.6% of total variance (Hair et al., 2019).

Table 4: Factor Loading, Reliability, and KMO Measure

Factor	Item	Loading	Uniqueness	KMO	Cronbach α
Public Speaking	pubspk1.1	0.859	0.214	0.9137	0.8973
	pubspk1.2	0.625	0.255	0.9216	
	pubspk1.3	0.651	0.276	0.9220	
	pubspk1.4	0.568	0.343	0.9353	
	pubspk1.5	0.782	0.201	0.9488	
Organizing Events	orgevnt1.1	0.843	0.255	0.9190	0.8991
	orgevnt1.2	0.674	0.285	0.9364	
	orgevnt1.3	0.869	0.208	0.9329	
	orgevnt1.4	0.765	0.252	0.9114	
	orgevnt1.5	0.655	0.325	0.9533	
Time Management	timemgt1.1	0.741	0.275	0.9451	0.8922
	timemgt1.2	0.732	0.290	0.9376	
	timemgt1.3	0.787	0.271	0.9102	
	timemgt1.4	0.780	0.305	0.9426	
	timemgt1.5	0.779	0.293	0.9249	
Teamwork	team1.1	0.708	0.351	0.9641	0.8975
	team1.2	0.825	0.238	0.9216	
	team1.3	0.853	0.212	0.9297	
	team1.4	0.650	0.316	0.9357	
	team1.5	0.681	0.231	0.9361	
Networking	ntwrk1.1	0.838	0.238	0.8996	0.8899
	ntwrk1.2	0.722	0.263	0.9279	
	ntwrk1.3	0.655	0.289	0.9506	
	ntwrk1.4	0.649	0.327	0.9617	
	ntwrk1.5	0.778	0.308	0.9341	

Leadership	ldr1.1	0.763	0.298	0.9206	0.8877
	ldr1.2	0.767	0.288	0.9408	
	ldr1.3	0.792	0.262	0.9294	
	ldr1.4	0.792	0.302	0.9311	
	ldr1.5	0.805	0.267	0.9038	
Problem Solving	slvprb1.1	0.746	0.309	0.9305	0.8834
	slvprb1.2	0.701	0.306	0.9255	
	slvprb1.3	0.717	0.320	0.9526	
	slvprb1.4	0.779	0.322	0.9121	
	slvprb1.5	0.752	0.243	0.9295	
Extracurricular Engagement	ec1.1	0.795	0.221	0.9150	0.8907
	ec1.2	0.696	0.268	0.9357	
	ec1.3	0.670	0.304	0.9315	
	ec1.4	0.742	0.269	0.9303	
	ec1.5	0.813	0.263	0.8633	
Microsoft Tools Skills	ms1.1	0.803	0.273	0.9132	0.8964
	ms1.2	0.831	0.272	0.9015	
	ms1.3	0.732	0.273	0.9158	
	ms1.4	0.761	0.301	0.9155	
	ms1.5	0.885	0.202	0.8546	
Career Goal Clarity	clrgoal1.1	0.860	0.253	0.8979	0.8973
	clrgoal1.2	0.824	0.238	0.8859	
	clrgoal1.3	0.801	0.288	0.8978	
	clrgoal1.4	0.740	0.297	0.8910	
	clrgoal1.5	0.883	0.245	0.8887	
Overall				0.9250	

Source: Findings based on survey data analysis

The factor loading values ranged from 0.568 to 0.885, indicating that all items loaded sufficiently on their respective factors and surpassed the commonly accepted minimum threshold of 0.40 (Samuels, 2017), with low cross-loadings and uniqueness values of approximately 0.2016 to 0.3513, further showing acceptable shared variance between each item in their corresponding canonical factor (Costello & Osborne, 2005). Inter-factor correlations were small (all $r \leq 0.56$ for ProMax rotation), suggesting that the ten factors are correlated but distinct constructs. The overall KMO measure of sampling adequacy was 0.925 for the scale, with in-dividual item KMO values for participant ratings ranging from 0.855 to a high and impressive 0.965, all exceeding an acceptable 0.80 meritorious threshold and striving close to (Kaiser, 1974) identified an excellent level of $KMO \approx 0.90$. Bartlett's test for

sphericity was highly significant ($\chi^2(1225) = 5457.87, p < 0.001$), indicating that the inter-item correlation matrix is not an identity matrix, and justifying the use of factor analysis on these data (Fabrigar et al., 1999; Hair et al., 2019). According to Hair et al. (2019), this determined that the internal consistency and reliability of measurement were strong in each respective subscale, with Cronbach's alpha reliability coefficients. P-values ranged from 0.8546 to 0.9533, confirming strong internal consistency and measurement reliability across all subscales.

4.3 Shapiro-Wilk Test for Normality

The results of the Shapiro-Wilk normality test are presented in Table 5. Results of pre-assessment variables for nine out of the ten skill domains were consistent with normality ($p > 0.05$), although teamwork was a marginal exception ($p = .026$; departure being small). On the other hand, all ten post-assessment variables significantly deviated from normality ($p < 0.001$) based on elevated V-statistics, suggesting ceiling-skewed distributions.

Table 5: Shapiro-Wilk Test for Normality

Variable	W	V	z	p-value
pubspk1 (Pre)	0.9947	0.618	-1.093	0.863
ldr1 (Pre)	0.9974	0.301	-2.720	0.997
team1 (Pre)	0.9797	2.361	1.948	0.026
orgevnt1 (Pre)	0.9837	1.896	1.450	0.073
slvprb1 (Pre)	0.9942	0.673	-0.897	0.815
clrgoal1 (Pre)	0.9917	0.969	-0.070	0.528
ntwrk1 (Pre)	0.9919	0.948	-0.122	0.549
ms1 (Pre)	0.9931	0.806	-0.488	0.687
ec1 (Pre)	0.9900	1.170	0.356	0.361
timemgt1 (Pre)	0.9880	1.399	0.761	0.223
pubspk2 (Post)	0.8584	16.482	6.353	< 0.001
ldr2 (Post)	0.8653	15.673	6.239	< 0.001
team2 (Post)	0.7830	25.243	7.319	< 0.001
orgevnt2 (Post)	0.9299	8.155	4.758	< 0.001
slvprb2 (Post)	0.8724	14.851	6.117	< 0.001
clrgoal2 (Post)	0.9562	5.102	3.694	< 0.001
ntwrk2 (Post)	0.9489	5.950	4.043	< 0.001
ms2 (Post)	0.9263	8.578	4.872	< 0.001
ec2 (Post)	0.9289	8.275	4.791	< 0.001
timemgt2 (Post)	0.9138	10.036	5.228	< 0.001

Source: Findings based on survey data analysis

This pattern, whereby baseline distributions that were only approximately normal become even less so after a successful intervention, is in line with one potential mechanism for the resulting positive skewness: the effect of most of the participants clustering at higher Likert scale values following effective training (Shapiro & Wilk, 1965). In addition, the violation of normality in the outcome variables after intervention ruled out a parametric paired t-test to compare change values, which led to a non-parametric paired Wilcoxon signed-rank test (Harris & Hardin, 2013; Wilcoxon, 1945).

4.4 Wilcoxon Signed-Rank Test

A Wilcoxon signed-rank test (Wilcoxon, 1945) was used for each of the ten paired skill variables. It ranks the signed absolute differences of paired pre-and post-assessment observations, determines if the median difference is significantly different from zero, and serves as the traditional non-parametric alternative to the paired t-test for data that do not follow a normal distribution (Harris & Hardin, 2013; Wilcoxon, 1945). Variance estimates were subjected to standard corrections, including ties and zero (Harris & Hardin, 2013). Results for all ten skill domains, including rank distributions, adjusted variances, and z-statistics, are exhibited in Table 6.

Table 6: Wilcoxon Signed-Rank Test Results

Skill Domain	Pos. N	Pos. Sum	Neg. N	Neg. Sum	Zero N	Adj. Variance	z	p-value
Public Speaking	105	10072.5	7	511.5	38	275,599.00	9.106	< 0.001
Leadership	101	9702.0	10	843.0	39	273,322.50	8.473	< 0.001
Teamwork	81	8604.5	13	1124.5	56	264,369.75	7.274	< 0.001
Event Organization	98	9708.0	8	627.0	44	273,811.88	8.677	< 0.001
Problem Solving	91	9157.0	9	893.0	50	268,123.75	7.980	< 0.001
Career Goal Clarity	70	7681.5	14	1432.5	66	256,126.50	6.174	< 0.001
Networking	101	9730.5	14	964.5	35	276,371.50	8.337	< 0.001
MS Tools Skills	90	9057.0	14	1187.0	46	272,234.13	7.542	< 0.001
ECA Engagement	77	8169.0	20	1725.0	53	268,564.50	6.217	< 0.001
Time Management	85	8820.5	12	1073.5	53	265,446.00	7.518	< 0.001

Source: Findings based on survey data analysis

Note. Pos. N = number of positive ranks; Pos. Sum = sum of positive ranks; Neg. N = number of negative ranks; Neg. Sum = sum of negative ranks; Zero N = number of zero differences; Adj. Variance = tie- and zero-adjusted variance.

Public speaking was the most influenced in the dataset ($z = 9.11$, $p < 0.001$), with mean scores increasing from a baseline of 2.93 (SD = 1.18) to 4.19 (SD = .78) following intervention, an average change of score on scale points, and representing the highest mean gain of any domain. ECA systematically places members into public speaking positions in which their performance is integral to success, through case competitions, panel presentations, and facilitated workshops, amongst others, where the repeated exposure creates these iterative success experiences that Bandura (2001) identifies as the most efficacious mechanisms for increasing self-efficacy, aligning with social cognitive theory.

Regarding external sources of cognitive overload, event organization had the second largest z statistic ($z = 8.68$, $p < 0.001$), with average scores increasing from 2.96 ($SD = 1.20$) to 4.17 ($SD=0.81$), a gain equal to 1.21 points on the Likert scale. This domain aligns directly with the JD-R motivational pathway. (Bakker & Demerouti, 2017) says that ECA club activities represent genuine resource environments in which students take on real responsibilities of planning, logistics and delegation that are characteristic of professional project management settings.

The z -statistic for Networking was 8.34 ($p < 0.001$) with a mean improvement of 1.20 points from pre- to post-assessment (2.82 to 4.02), being the lowest pre-assessment domain mean across all ten domains ($M = 2.82$), establishing significant transformed impairment in relational capital prior to intervention delivery and confirming hyper severe relative baseline deficit within this asset social net area (Bembenutty et al., 2016; Eccles & Barber, 1999). Such a pattern corresponds to the JD-R model vision of ECA as resources embedded in social capital, increasing the degree of structured exposure to peers, alumni, facilitators, and industry practitioners, which generates the relational chances that turn into networking competence (Bakker & Demerouti, 2017; Schaufeli & Taris, 2014).

Leadership skills increased significantly ($z = 8.47$, $p < 0.001$) from a pre-mean of 3.15 ($SD = 0.99$) to a post-mean of 4.19 ($SD = 0.80$). SCT states that leadership competencies are learned through observation and guided mentoring (Bandura, 2001; Bembenutty et al., 2016), both of which are structural aspects of career-oriented ECA clubs in which junior members observe senior student leaders and gradually take on more organizational roles. According to Northouse (2019), leadership is one of the most consistently teachable skills when individuals are integrated into organizationally relevant practice environments, a condition by nature afforded through ECA club involvement. This finding aligns with evidence that inclusive leadership fosters organizational learning and proactive employee behavior, indicating that competencies developed through ECA participation may similarly promote inclusive, learning-oriented workplace conduct (Rita & Islam, 2025).

Results showed that problem-solving competencies increased significantly ($z = 7.98$, $p < 0.001$) from pre-assessment ($M = 3.27$, $SD = 0.97$) to post-assessment ($M = 4.13$, $SD = 0.72$). ECA case competitions are highly structured problem-solving environments in which participants must use analytical thinking in time-constrained, competitive situations, exactly the conditions identified by SCT as historically efficacious for self-efficacy development through mastery experiences (Bandura, 2001). SCT-based educational interventions can significantly improve skills in problem-solving and critical thinking, as demonstrated by Almulla & Al-Rahmi (2023), which are also supported by the findings of this study when conducted in an extracurricular rather than formal instructional context.

Microsoft Office Tools expertise showed a large improvement in proficiency of Microsoft tools ($z = 7.54$, $p < 0.001$): mean score increased from 3.13 ($SD = 1.21$) to 4.12 ($SD = 0.75$). While pure interpersonal domains are not entirely free from the above need for task-based practice, Microsoft Office is a technical hard skill whose development depends specifically on direct reciprocal kinesthetic engagement, exactly what ECA skill-development boot camps and facilitated digital workshops provide (Peck et al., 2016).

There was a statistically significant increase in time management ($z = 7.52$, $p < 0.001$) with mean scores rising from 3.43 ($SD = 1.10$) to 4.24 ($SD = 0.79$). Aeon et al. (2021), in a meta-analysis of time management interventions, noted that structured schedules and priority practice reduce work stress consistently, enhance productivity, and improve perceived employability reliably. The JD-R motivational pathway (Bakker & Demerouti, 2017) fits particularly well here, juggling the competing demands of fulfilling academic requirements while actively engaged in the ECA genre, and structurally engendering self-regulatory behaviors that the levels of time management competence encompass.

Most notably, there was a substantial improvement in teamwork competencies ($z = 7.27$, $p < 0.001$), which had the highest post-assessment mean among all domains ($M = 4.41$, $SD = 0.70$). The ceiling-proximate post-assessment mean with the highest number of pairs of zero-difference ($n = 56$) shows that teamwork was the most robust skill area at baseline ($M = 3.60$), which limits the extent to which further measurable improvements can be made, where teamwork development based on ECA mechanisms is hardly affected through diverse national settings (Hisyam Mohd. Hashim, 2015).

Competency in extracurricular engagement also improved markedly ($z = 6.22$, $p < 0.001$), but had one of the two lowest z-statistics due primarily to a high volume of zero-difference pairs ($n = 53$), reflecting stability among those participants that began with moderately engaged self-assessments. This essence of participation is echoed in Astin's (1999) theory of student involvement, which explains that the quality and degree of engagement, not the actual participation alone, drive developmental results. This argument is then extended by Kuh, G. D. (2008), who has shown that high-impact educational practices (such as prolonged student organization participation) lead to gains in self-efficacy development and professional identity.

The lowest z-statistic in the dataset was for career goal clarity ($z = 6.17$, $p < .001$), with average scores increasing from 3.43 ($SD = 1.06$) to 4.03 ($SD = 0.88$), and also the largest number of zero-difference pairs across all domains ($n = 66$). Nevertheless, the improvement is still highly significant and in line with Alvarez Sainz et al. (2019), who found that students who engaged in structured activities had clearer and more purposeful career direction. From the JD-R perspective (Bakker & Demerouti, 2017), ECA broadened participants' access to career-related information, professional connections, and occupational role models that help clarify career directions over time. The SCT mechanism of observational learning (Bandura, 2001) is also in play. Witnessing senior ECA members engage with career decisions provides vicarious behavior guidance that refines participants own occupational self-concepts.

5. Generalizability and Practical Implications

The implications of these findings are significantly focused on extracurricular skill development, which is equally effective in a variety of cultural, institutional, and national situations (Cortellazzo et al., 2021; Mahoney et al., 2003; Nguyen et al., 2020). The theoretical underpinnings leveraged in this study, self-efficacy pathways (Bandura, 2001) and JD-R resource-building processes (Bakker & Demerouti, 2017), are broadly validated across populations and institutional types, suggesting that the

mechanisms of skill enhancement observed here reflect higher-order principles of experiential learning that cut across educational systems.

Based on the estimates presented here, systematic institutional investment in structured ECA can lead to real and practically significant improvements in the competencies that employers most consistently find lacking among new graduates (Shibli, 2024; Wahab, 2025). Policymakers and administrators may formalize ECA involvement in supplemental achievement frameworks, devote dedicated resources for club facilitator training, and implement cross-institutional standardization protocols that promote the delivery of at least a minimum quality program across university sites. This recommendation is reinforced by evidence from other Bangladeshi organizational settings showing that strong top management commitment is a critical driver of successful quality-management implementation, underscoring the importance of sustained institutional leadership for such standardization efforts to succeed (Rita & Islam, 2024).

6. Conclusion

This paper provides strong empirical evidence and demonstrates that structured extracurricular participation leads to statistically significant improvements in all competency domains considered. The greatest improvements were in public speaking, event organization, and networking areas, where applied learning and peer interaction matter more than passive receipt of information. Extracurricular activities are thus an organizational resource that builds students' social connections, relational capital, and occupational self-efficacy. While the gains made in teamwork, problem-solving, digital proficiency, leadership, and time management point to extracurricular activities as an experiential training environment, a coalescence of such gains is better manifest as a reduction in standard deviations across all ten domains. The reduction observed helps to manifest how positive experiential interventions progressively narrow intra-group competence disparities over time. Thus, the integration of statistically rigorous methodology, theoretical alignment with Social Cognitive Theory and the Job Demands-Resources Model, along with consistent cross-domain skill development, makes this study a significant contribution to the literature on extracurricular learning. For institutions that are dealing with the structural crisis of graduate employability, especially those in developing economies like Bangladesh, the message is clear. Structured, career-oriented extracurricular activities are not simply another institutional supplement but rather a pedagogically justified and empirically supported avenue for building the comprehensive competencies now required by today's labor market. Those universities that do not institutionalize such engagement will be perpetuating the very skills gap they are supposed to bridge.

7. Limitations and Recommendations for Future Research

A limitation of this study is its restricted cultural and educational context, which may limit generalizability. Future research should emphasize cross-cultural validation in diverse settings to identify context-specific factors influencing program effectiveness. Comparative studies examining alternative student development interventions are also recommended to determine which approaches are most effective for different student groups, control groups, and institutional contexts.

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Instruments		
Construct	Code	Item
Public Speaking	pubspk1	I can speak clearly in front of a group of people.
	pubspk2	I feel confident when I give a presentation.
	pubspk3	I can explain my ideas well when talking to others.
	pubspk4	I can speak without getting too nervous.
	pubspk5	I can answer questions from others when I present.
Event Organization	orgevnt1	I can plan and organize events step by step.
	orgevnt2	I manage tasks and duties well during an event.
	orgevnt3	I can handle problems that come up during an event.
	orgevnt4	I work with a team to successfully run an event.
	orgevnt5	I complete event-related tasks on time without missing deadlines.
Time Management	timemgt1	I complete my tasks before the deadline.
	timemgt2	I make a plan for my day or week in advance.
	timemgt3	I balance my studies, club activities, and personal life well.
	timemgt4	I avoid wasting time and stay focused on important tasks.
	timemgt5	I handle multiple tasks at once without getting overwhelmed.
Teamwork	team1	I work well with others in a group.
	team2	I listen to my teammates' ideas and respect them.
	team3	I share my responsibilities fairly with my group.
	team4	I help my teammates when they need support.
	team5	I handle disagreements in a calm and polite way.

Networking	ntwrk1	I easily make new friends and professional connections.
	ntwrk2	I stay in touch with people I meet at events or programs.
	ntwrk3	I use my connections to find opportunities and useful information.
	ntwrk4	I can introduce myself confidently to new people.
	ntwrk5	I build relationships that may help me in my future career.
Leadership	ldr1	I can guide a group of people to complete a task.
	ldr2	I help others when they face problems in a team.
	ldr3	I can make decisions when my team needs direction.
	ldr4	I motivate my teammates to give their best effort.
	ldr5	I take responsibility when something goes wrong in my team.
Problem Solving	slvprb1	I can find solutions when I face a difficult situation.
	slvprb2	I think carefully before deciding what to do.
	slvprb3	I look for creative ways to fix a problem.
	slvprb4	I stay calm and focused when there is a problem.
	slvprb5	I can solve problems even when I am under pressure.
Extracurricular Engagement	ec1	I actively take part in club activities and programs.
	ec2	I take on responsibilities in my club or organization.
	ec3	I attend events and workshops organized by my club.
	ec4	I contribute my ideas and efforts to club activities.

	ec5	I feel that my club involvement helps me grow as a person.
Microsoft Tools Proficiency	ms1	I can use Microsoft Word to write and format documents.
	ms2	I can use Microsoft Excel to organize and work with data.
	ms3	I can use Microsoft PowerPoint to make presentations.
	ms4	I can use Microsoft tools to complete my academic or work tasks.
	ms5	I am comfortable learning new features in Microsoft Office.
Career Goal Clarity	clrgoal1	I know what career I want to have in the future.
	clrgoal2	I have a clear plan for reaching my career goals.
	clrgoal3	I know what skills I need to develop for my future job.
	clrgoal4	I take steps to prepare myself for my career.
	clrgoal5	I can explain my career goals clearly to others.

