Scientific Knowledge Group

ISSN: 3067-722X

Research Article

Journal of Economics and Business Management Reports

Determinants of Life Skills among University Students in Mongolia: Evidence from the University of Finance and Economics

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ABSTRACT

This paper examines the factors associated with university students' life skills using survey evidence from Mongolia. Although these competencies are increasingly recognized as important for academic success, employability, psychological well-being, and social participation, empirical evidence from Mongolian higher education remains limited. Using survey data from 392 students, the study analyzes ten dimensions: self-awareness, empathy, communication, interpersonal skills, decision-making, problem-solving, creative thinking, critical thinking, emotion coping, and stress coping. The empirical analysis combines descriptive statistics, reliability and exploratory factor analysis, correlation analysis, group-difference tests, multiple regression, hierarchical regression, and skill-specific regression models. The results show that the surveyed students report a moderately high overall level of life skills. Empathy and self-awareness have the highest mean scores, whereas stress coping and emotion coping have the lowest scores. The overall 60-item scale demonstrates excellent internal consistency, although some subscales are weakened by reverse-coded items; there- fore, the total score is treated as the primary empirical outcome. The regression results indicate that family factor has the strongest and most consistent association with students' life skills, followed by educational environment and school factor. By contrast, social factor does not have a statistically significant unique association after controlling for the other explanatory variables. The hierarchical regression results further show that family, school, social, and educational-environment factors ex- plain substantial additional variance beyond demographic characteristics. These findings suggest that students' development is associated not only with individual characteristics, but also with family sup- port and institutional learning conditions. The paper concludes that universities should strengthen student-development policies by integrating life-skills education, supportive learning environments, counselling services, mentoring, and extracurricular engagement into higher education practice.

Keywords: Life Skills, University Students, Higher Education, Mongolia, Family Factor, Educational Environment, Student Development.

Received: May 06, 2026;
Accepted: May 13, 2026;
Published: May 20, 2026

Introduction

Life skills have become an increasingly important component of higher education because universities are expected not only to provide academic knowledge, but also to support students' personal development, social participation, employability, and psychological well-being. The World Health Organization defines life skills as abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life World Health Organization [1]. Within this framework, life skills include self-awareness, empathy, communication, interpersonal relationships, decision-making, problem-solving, creative thinking, critical thinking, coping with emotions, and coping with stress World Health Organization [1]. These competencies are especially important for university students, who must manage academic pressure, social relationships, career choices, emotional challenges, and the transition toward independent adulthood Arnett; Chickering and Reisser [2,3].

Citation: Namuun Ganbold, Azjargal Battulga and Tumendelger Lkhagvasuren (2026) Determinants of Life Skills among University Students in Mongolia: Evidence from the University of Finance and Economics. J Econo Bus Mang Rep 2: 1-18.

The importance of life skills is also emphasized in the literature on social and emotional learning. Social and emotional learning refers to the process through which individuals develop the knowledge, attitudes, and skills required to understand and manage emotions, establish positive relationships, make responsible decisions, and achieve personal and academic goals CASEL; Durlak et al. [4,5]. Empirical evidence shows that social and emotional competencies are associated with academic performance, positive behaviour, psychological well-being, and long-term student development Durlak et al.; Taylor et al.; OECD [5-7]. In higher education, life skills are also closely linked to graduate employability, since employers increasingly value communication, teamwork, adaptability, problem-solving, and critical thinking alongside technical knowledge Yorke and Knight; Robles [8,9].

Despite the growing recognition of life skills, the existing literature has several limitations. First, much of the empirical research has focused on school-aged children, adolescents, or structured social and emotional learning interventions, while university students have received comparatively less attention Durlak et al.; Taylor et al.; OECD [5-7]. Second, studies on graduate employability often examine soft skills from a labour-market perspective, but they do not always analyze life skills as a broader multidimensional construct that includes cognitive, interpersonal, and emotional-coping dimensions Yorke and Knight; Robles [8,9]. Third, previous studies have often examined selected determinants separately, such as family background, school environment, peer relationships, or educational conditions, rather than assessing how family, school, social, and educational-environment factors jointly explain life-skills development. Finally, empirical evidence from developing-country higher education contexts remains limited. This is important because students' life-skills development is shaped not only by individual characteristics, but also by family relationships, institutional support, peer interaction, teaching quality, extracurricular participation, and the broader learning environment Bronfenbrenner; Bandura; Pascarella and Terenzini [10-12].

Mongolia provides a relevant context for addressing this gap. As higher education expands and labour market expectations change, Mongolian university students face increasing pressure to develop not only academic knowledge but also transferable competencies such as communication, decision-making, problem-solving, creativity, emotional regulation, and stress coping. However, empirical research on the level, structure, and determinants of life skills among Mongolian university students remains limited. In particular, little is known about whether students' life skills are more strongly associated with family support, school-related factors, social factors, or the educational environment. This lack of evidence limits the ability of universities and policymakers to design targeted student-development programs, counseling services, extracurricular activities, and supportive learning environments.

Against this background, this paper examines the factors associated with university students' life skills using survey evidence from Mongolia. The study uses data from 392 students at the University of Finance and Economics and analyzes ten core life-skills dimensions: self-awareness, empathy, comunication, interpersonal skills, decision-making, problem-solving, creative thinking, critical thinking, emotion coping, and stress coping. The main explanatory variables are family factor, school factor, social factor, and educational environment. The empirical analysis combines descriptive statistics, reli- ability and factor analysis, correlation analysis, group-difference tests, multiple regression, hierarchical regression, and skill-specific regression models.

The study addresses three research questions. First, what is the overall level and dimensional profile of life skills among the students in the sample? Second, do students' life-skills scores differ by selected demographic and educational characteristics, including gender, GPA, working status, and club member- ship? Third, to what extent are family, school, social, and educational-environment factors associated with students' overall and skill-specific life-skills development?

This paper makes three contributions. First, it provides empirical evidence from the Mongolian higher education context, extending social-emotional-learning and student-development research beyond the settings most commonly examined in previous studies. Second, it treats the outcome as a multidimensional construct by analyzing both the total score and ten separate dimensions, allowing the study to identify students' relative strengths and weaknesses. Third, it jointly examines the roles of family, school, social, and educational-environment factors using overall and skill-specific regression models. These contributions provide practical evidence for higher education institutions seeking to strengthen student-development policies, support services, and learning environments.

The remainder of the paper is organized as follows. The next section reviews the literature on life skills, social and emotional learning, student development, and the role of family, school, social, and educational-environment factors. The following section presents the methodology, including the research design, sample, measurement instrument, variable construction, and statistical procedures. The subsequent section reports the empirical results. The final section concludes and discusses implications for higher education policy and student development practice in Mongolia.

Literature Review

Conceptual Foundations of Life Skills

Life skills have become an important concept in educational research, youth development, public health, and social-emotional learning. The World Health Organization defines life skills as abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life World Health Organization [1]. This definition emphasizes that life skills are not limited to academic knowledge, but include cognitive, emotional, interpersonal, and behavioural competencies that help young people manage personal development, social relationships, decision-making, and life transitions.

The WHO framework identifies ten core life skills: self-awareness, empathy, communication, interpersonal relationships, decision-making, problem-solving, creative thinking, critical thinking, coping with emotions, and coping with stress World Health Organization [1]. These ten dimensions provide the conceptual foundation for the present study. They are particularly relevant for university students be- cause higher education is not only a period of academic learning, but also a stage of psychological, social, and professional development. Students must adjust to new academic expectations, manage peer relationships, make career decisions, cope with stress, and prepare for independent adult life Arnett; Chickering and Reisser [2,3].

Life skills are closely related to the broader field of social and emotional learning. Social and emotional learning refers to the process through which individuals acquire and apply knowledge, attitudes, and skills to understand and manage emotions, set and achieve goals, show empathy, establish positive relationships, and make responsible decisions CASEL; Durlak et al. [4,5]. The CASEL framework identifies five broad competence domains: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making CASEL [4]. These domains overlap strongly with the WHO life-skills framework. For example, self-awareness corresponds to understanding one's emotions, strengths, and limitations; relationship skills correspond to communication and interpersonal abilities; and responsible decision-making corresponds to decision-making and problem-solving skills World Health Organization; CASEL [1,4].

UNICEF also extends the life-skills concept by linking it to empowerment, resilience, citizenship, employability, and social inclusion UNICEF [13,14]. From this perspective, life skills are not merely individual psychological traits, but competencies shaped by family, school, community, and social environments. This view is especially relevant in developing-country contexts, where students' opportunities to develop life skills may be influenced by unequal access to supportive family conditions, quality schooling, extracurricular activities, and institutional support UNICEF; OECD [13,7].

Life Skills and Student Development

The importance of life skills in education is supported by several theoretical perspectives. From a developmental perspective, late adolescence and emerging adulthood are periods in which young people develop identity, autonomy, emotional regulation, and future orientation Erikson; Arnett [15,2]. University students are expected to make academic, social, and career-related decisions while gradually becoming more independent from their families. During this transition, life skills help students manage uncertainty, regulate emotions, communicate with others, and adapt to new environments Chickering and Reisser; Pascarella and Terenzini [3,12].

From a social learning perspective, life skills are developed through observation, practice, feedback, and reinforcement within social environments Bandura [11]. Students learn communication, problem- solving, and coping strategies not only through formal instruction, but also through family interaction, peer relationships, teachers, mentors, and institutional culture. Bandura's theory of self-efficacy is also relevant because students who believe in their ability to manage academic and social challenges are more likely to demonstrate persistence, adaptive behaviour, and effective decision-making Bandura [16].

Bronfenbrenner's ecological systems theory provides another useful framework for understanding life- skills development. According to this theory, individual development occurs within nested systems, including the family, school, peer group, community, and broader socio-cultural environment Bronfenbrenner [10]. Life skills are therefore shaped by the interaction between personal characteristics and environmental conditions. This supports the analytical structure of the present study, which examines family factor, school factor, social factor, and educational environment as explanatory factors associated with students' life skills.

Higher education research also emphasizes that student development is influenced by both academic and non-academic experiences. Pascarella and Terenzini Pascarella and Terenzini argue that college affects students not only through classroom instruction, but also through peer interaction, faculty engagement, institutional climate, and extracurricular participation [12]. Similarly, Astin's theory of student involvement suggests that students develop more when they invest physical and psychological energy in academic and social activities Astin [17]. This implies that club membership, working experience, and participation in campus life may contribute to communication, creativity, leadership, and self-awareness.

Empirical Evidence on Social and Emotional Learning

A large body of empirical research supports the value of life-skills and social-emotional-learning programs. Durlak et al. Durlak et al. conducted a meta-analysis of school-based universal social-emotional-learning programs and found that such programs improved students' social-emotional skills, attitudes, behaviour, and academic performance [5]. This evidence shows that social and emotional competencies are associated with both personal and educational outcomes.

Taylor et al. Taylor et al. extended this evidence by examining the follow-up effects of social- emotional-learning interventions [6]. Their meta-analysis found that the benefits of these programs can persist over time, including improvements in social-emotional skills, attitudes, positive social behaviour, and academic performance. These findings suggest that life-skills development is not merely a short-term educational activity, but may have long-term developmental importance.

OECD research also emphasizes the role of social and emotional skills in student outcomes. The OECD Survey on Social and Emotional Skills shows that such skills are connected to academic success, well-being, employability, active citizenship, and health outcomes OECD [7,18]. These findings support the argument that universities should not focus only on cognitive achievement, but should also strengthen students' socio-emotional and life-management capacities.

In higher education, life skills are increasingly discussed in relation to employability and graduate readiness. Employers often expect graduates to possess not only technical knowledge, but also communication, teamwork, adaptability, problem-solving, and critical thinking skills Yorke and Knight; Robles [8,9]. Robles Robles finds that soft skills such as communication, responsibility, professionalism, teamwork, and interpersonal skills are highly valued by employers [9]. Therefore, life skills are directly connected to students' future labour-market performance and career development.

The Ten Core Life-Skills Dimensions

The ten core life-skills dimensions used in this study are based on the WHO framework World Health Organization (1994). Self-awareness refers to the ability to understand one's own emotions, values, strengths, weaknesses, motivations, and behavioural patterns. It is a foundational life skill because students who understand themselves are better able to set goals, make decisions, regulate their behaviour, and seek support when necessary CASEL; Zimmerman [4,19].

Empathy is the ability to understand and share the feelings and perspectives of others. It supports prosocial behaviour, respectful relationships, teamwork, and conflict resolution Davis; CASEL [20,4]. Communication skills include the ability to express ideas clearly, listen actively, interpret verbal and non-verbal signals, and participate effectively in interpersonal exchange World Health Organization [33]. These skills are widely recognized as important for classroom participation, teamwork, academic collaboration, and employability Robles [9].

Interpersonal skills refer to the ability to build and maintain positive relationships, cooperate with others, manage conflict, and work effectively in groups World Health Organization [1]. These skills are particularly important in university contexts because academic success and personal well-being of- ten depend on peer support, teamwork, and social integration Tinto (1993); Pascarella and Terenzini [21,12]. Decision-making refers to the ability to evaluate alternatives, consider consequences, and choose appropriate courses of action World Health Organization [1]. It is closely related to responsible decision-making in the social-emotional-learning framework CASEL [4].

Problem-solving is the ability to identify problems, analyze causes, generate alternatives, and implement solutions World Health Organization [1]. It is one of the most important cognitive life skills and is closely connected with academic performance and employability OECD; Yorke and Knight [7,8]. Creative thinking refers to the ability to generate new ideas, approach problems from different perspectives, and develop original solutions World Health Organization [1]. It is increasingly emphasized in modern education because labour markets require adaptability, innovation, and flexible thinking OECD [7].

Critical thinking is the ability to analyze information, evaluate evidence, question assumptions, and make reasoned judgments Facione; World Health Organization [22,1]. It is widely recognized as a core outcome of higher education Pascarella and Terenzini [12]. Coping with emotions refers to the ability to recognize, understand, and regulate emotional responses World Health Organization [1]. Emotional regulation is central to psychological well-being, academic persistence, and healthy relationships Gross [23]. Finally, coping with stress refers to the ability to manage pressure, adapt to challenges, and use constructive strategies when facing difficulties Lazarus and Folkman (1984); World Health Organization [24,1]. This dimension is especially relevant for university students, who often face academic workload, examinations, financial pressure, employment concerns, and social expectations.

Family Factor and Life Skills

Family is one of the most important environments for the development of life skills. Family relationships shape early socialization, emotional security, communication patterns, self-confidence, and behavioural norms Bronfenbrenner; Bandura [10,11]. Parents and family members provide models of communication, decision-making, problem-solving, emotional regulation, and stress coping. Supportive family environments can strengthen students' self-esteem, social competence, and resilience Baumrind; Steinberg [25,26].

Family support is also related to educational adjustment. Students who receive encouragement and emotional support from family members are more likely to develop confidence, persistence, and adaptive coping strategies Wentzel [27]. In family-oriented societies, family expectations and support may play an especially important role in students' personal development. Therefore, it is theoretically reasonable to expect family factor to be positively associated with students' life-skills development.

School Factor and Life Skills

Schools and universities are central institutional environments for life-skills development. Educational institutions provide not only formal knowledge, but also social norms, peer interaction, teacher feed- back, discipline, collaborative learning, and opportunities for leadership Pascarella and Terenzini [12]. School climate, teacher support, academic expectations, and student–teacher relationships can influence students' motivation, self-efficacy, emotional development, and social behaviour Wentzel; Hamre and Pianta [27,28].

Social-emotional-learning research shows that school-based programs can improve students' social- emotional competencies and academic outcomes Durlak et al.; Taylor et al. [5,6]. This suggests that educational institutions can intentionally strengthen life skills through curriculum design, teaching methods, counselling, student services, and extracurricular programs. Supportive teachers and a positive institutional climate may help students develop empathy, communication, interpersonal skills, and responsible decision-making CASEL [4].

Educational Environment and Life Skills

The educational environment refers to the broader institutional context in which learning takes place. It includes teaching quality, learning support, practical learning opportunities, student services, academic resources, counselling, and opportunities for student engagement. A positive educational environment can promote academic motivation, self-regulation, collaboration,

creativity, and psychological well-being Astin; Pascarella and Terenzini [17,12].

Modern higher education literature emphasizes that student development depends on active learning environments rather than passive knowledge transmission. Project-based learning, experiential learning, group assignments, internships, mentoring, and student clubs can contribute to problem-solving, communication, creativity, and coping skills Kolb; Kuh [29,30]. Kuh Kuh argues that high-impact educational practices, such as collaborative projects, undergraduate research, service learning, and internships, can increase student engagement and developmental outcomes [30].

The educational environment is also linked to student well-being. Supportive learning spaces, accessible teachers, counselling services, and inclusive institutional culture can help students manage stress and emotions OECD [7,18]. Therefore, the educational environment is expected to be positively associated with students' life-skills development, particularly skills related to problem-solving, emotional regulation, stress coping, and interpersonal adjustment.

Social Factor and Life Skills

Social factors include peer relationships, social norms, community expectations, media influences, and broader socio-cultural conditions. According to ecological systems theory, individual development is shaped not only by family and school, but also by peer groups, community environments, and cultural systems Bronfenbrenner [10]. Peer relationships can influence communication, identity formation, emotional development, and behavioural choices Brown [31]. Social support from peers may also help students cope with stress and adjust to university life Tinto [21].

However, the influence of social factors may be complex. Peer and social environments can be supportive, but they can also create pressure, comparison, distraction, or negative behavioural norms. Therefore, the relationship between social factor and life skills may depend on the quality of social relationships and the specific cultural context. For this reason, social factor is included in the empirical model as an explanatory variable associated with students' life-skills development.

Academic Performance, Extracurricular Participation, and Life Skills

Academic performance is often linked to self-regulation, motivation, problem-solving, communication, and stress management Zimmerman (2000); Robbins et al. [19,32]. Students with stronger life skills may be better able to manage time, seek help, cooperate with peers, cope with academic pressure, and make effective learning decisions. Conversely, students with stronger academic performance may gain confidence and develop stronger communication and decision-making skills through successful educational experiences.

Meta-analytic evidence shows that psychosocial and study-skill factors are associated with college outcomes Robbins et al. [32]. Similarly, social-emotional-learning research shows that social-emotional competencies can contribute to academic achievement Durlak et al.; Taylor et al. [5,6]. The OECD also emphasizes that social and emotional skills are related to academic success and well-being OECD [7].

Extracurricular participation and work experience are also important developmental contexts for university students. Student clubs, volunteering, leadership activities, and part-time work can provide opportunities to practice communication, teamwork, responsibility, creativity, time management, and problem-solving Astin; Kuh [17,30]. Involvement theory suggests that students develop more when they actively participate in academic and social environments Astin [17]. However, work experience may have mixed effects because it can provide practical learning opportunities while also increasing stress and time pressure. Therefore, academic performance, club membership, and working status are considered relevant characteristics in examining students' life-skills development.

Gender Differences in Life Skills

Prior studies often report gender differences in selected social and emotional skills, particularly empathy and communication. Empathy research has frequently found higher self-reported empathy among female students, although the size and interpretation of gender differences depend on measurement method and cultural context Davis (1983); Eisenberg et al. [20,33]. Gender socialization may encourage girls and young women to express empathy, communication, and relational sensitivity more strongly, while boys and young men may be socialized differently in emotional expression and interpersonal behaviour Eagly [34].

However, gender differences are not necessarily uniform across all life-skills dimensions. Some skills may show gender differences, while others may not. Therefore, this study examines gender differences across the ten life-skills dimensions as well as the total life-skills score [35].

Summary of Literature Review

The literature shows that life skills are multidimensional competencies essential for students' academic success, psychological well-being, employability, and social participation. The WHO framework provides the ten-dimensional structure used in this study, while social-emotional-learning literature and OECD research support the broader importance of social and emotional competencies. Theoretical perspectives such as ecological systems theory, social learning theory, student involvement theory, and self-regulated learning theory suggest that life skills are shaped by family, school, peer, and institutional environments. Overall, the literature supports the expectation that family factor, school factor, social factor, and educational environment are associated with students' life-skills development. It also suggests that demographic and educational characteristics such as gender, GPA, working status, and extracurricular participation may be related to selected life-skills dimensions. Based on this literature, the present study empirically examines the factors associated with life skills among university students in Mongolia.

Methodology

This section presents the methodological approach used to examine the factors associated with university students' life skills. The section describes the research design, population and sample, measurement instrument, variable construction, data preparation procedures, reliability and validity assessment, and statistical techniques used in the empirical analysis.

Research Design

This study adopts a quantitative cross-sectional research design. The purpose of the study is to examine the level of life skills among university students and to identify the personal, family, school, social, and educational-environment factors associated with those skills. A cross-sectional survey design is appropriate because the study measures students' perceptions and self-reported life-skills levels at one point in time.

The empirical analysis is explanatory in nature. It first describes the distribution of students' life- skills scores and demographic characteristics, then examines group differences and relationships among variables. Finally, regression analysis is used to estimate the extent to which family, school, social, and educational-environment factors are associated with students' total life-skills scores.

Because the data are cross-sectional and based on self-reported survey responses, the results should be interpreted as statistical associations rather than causal effects.

Population and Sample

The target population of the study consists of undergraduate students of the University of Finance and Economics. The final sample includes 392 valid student responses. Respondents were enrolled in different academic years and represented a wide range of majors.

The sample includes first-year to fourth-year students. For analytical clarity, the 29 detailed majors reported by respondents were grouped into six broader categories: business, economics, law, technology, teacher education, and humanities/other fields. This grouping was used to increase analytical power and to avoid excessively small cell sizes in group-difference analysis.

Table 1 summarizes the main sample characteristics used in the analysis.

Table 1: Summary of Sample Characteristics

Variable	Category	*n*	Percent
Gender	Male	142	36.2
Gender	Female	250	63.8
Academic year	First year	130	33.2
Academic year	Second year	151	38.5
Academic year	Third year	62	15.8
Academic year	Fourth year	49	12.5
Major group	Business	170	43.4
Major group	Technology	87	22.2
Major group	Humanities and others	55	14.0
Major group	Economics	46	11.7
Major group	Law	17	4.3
Major group	Teacher education	17	4.3
Working status	Full-time working	53	13.5
Working status	Part-time working	112	28.6
Working status	Not working	227	57.9
Club membership	Yes	131	33.4
Club membership	No	261	66.6

Measurement Instrument

The study used a structured questionnaire to measure students' life skills and the factors associated with their development. The questionnaire consisted of four main parts.

First, the demographic section collected information on gender, age, academic year, GPA group, major, residence, living arrangement, family size, family structure, parental education, household income, working status, and club membership.

Second, the life-skills section measured ten core life-skills dimensions. These were self-awareness, empathy, communication, interpersonal skills, decision-making, problem-solving, creative thinking, critical thinking, emotion coping, and stress coping. Each dimension was measured using six items, resulting in a total of 60 life-skills items.

Third, the questionnaire measured three groups of influencing factors: family factor, school factor, and social factor. Each factor consisted of five items, resulting in 15 items.

Fourth, the educational-environment scale consisted of eight items measuring students' perceptions of the broader educational environment, including teaching, learning support, practical learning opportunities, and institutional support.

All scale items were measured using a five-point Likert scale. Higher values indicate stronger agreement with the statement or a higher level of the measured construct.

Variable Construction

The main dependent variable of the study is the total life-skills score. This variable was computed from ten life-skills dimensions. Each life-skills dimension was first calculated as the mean of its six corresponding items after reverse coding the negatively worded item. The total life-skills score was then calculated as the mean of the ten life-skills dimension scores.

Let LS_{ik} denote the score of student i on life-skill dimension k, where $k = 1, \ldots, 10$. The total life-skills score for student i is defined as:

$$LifeSkillsTotal_i = \frac{1}{10}\sum_{k=1}^{10} LS_{ik}. \quad (3.1)$$

The ten life-skills dimensions were computed as follows:

$$SelfAwareness_i = \frac{1}{6}\sum_{j=1}^{6} SA_{ij}, \tag{3.2}$$

$$Empathy_i = \frac{1}{6}\sum_{j=1}^{6} EM_{ij}, \tag{3.3}$$

$$Communication_i = \frac{1}{6}\sum_{j=1}^{6} CM_{ij}, \tag{3.4}$$

$$Interpersonal_i = \frac{1}{6}\sum_{j=1}^{6} IP_{ij}, \tag{3.5}$$

$$DecisionMaking_i = \frac{1}{6}\sum_{j=1}^{6} DM_{ij}, \tag{3.6}$$

$$ProblemSolving_i = \frac{1}{6}\sum_{j=1}^{6} PS_{ij}, \tag{3.7}$$

$$CreativeThinking_i = \frac{1}{6}\sum_{j=1}^{6} CR_{ij}, \tag{3.8}$$

$$CriticalThinking_i = \frac{1}{6}\sum_{j=1}^{6} CT_{ij}, \tag{3.9}$$

$$EmotionCoping_i = \frac{1}{6}\sum_{j=1}^{6} EC_{ij}, \tag{3.10}$$

$$StressCoping_i = \frac{1}{6}\sum_{j=1}^{6} SC_{ij}. \tag{3.11}$$

The explanatory variables were constructed as mean scores of their corresponding items:

$$FamilyFactor_i = \frac{1}{5}\sum_{j=1}^{5} FAM_{ij}, \tag{3.12}$$

$$SchoolFactor_i = \frac{1}{5}\sum_{j=1}^{5} SCH_{ij}, \tag{3.13}$$

$$SocialFactor_i = \frac{1}{5}\sum_{j=1}^{5} SOC_{ij}, \tag{3.14}$$

$$EduEnvironment_i = \frac{1}{8}\sum_{j=1}^{8} EDU_{ij}. \tag{3.15}$$

Reverse Coding

Each of the ten life-skills dimensions included one negatively worded item. These items were reverse- coded before calculating composite scores. The reverse coding was conducted using the following trans- formation:

$$X_{ij}^{R} = 6 - X_{ij}, \tag{3.16}$$

where X_{ij} is the original Likert-scale response and X^{R}_{ij} is the reverse-coded value. Thus, an original response of 1 was recoded as 5, 2 as 4, 3 remained 3, 4 was recoded as 2, and 5 was recoded as 1.

The reverse-coded items were:

Table 2: Reverse-Coded Life-Skills Items

Variable code	Life-skill dimension	Description
q15_6	Self-awareness	Negatively worded item
q16_6	Empathy	Negatively worded item
q17_6	Communication	Negatively worded item
q18_6	Interpersonal skills	Negatively worded item
q19_6	Decision-making	Negatively worded item
q20_6	Problem-solving	Negatively worded item
q21_6	Creative thinking	Negatively worded item
q22_6	Critical thinking	Negatively worded item
q23_6	Emotion coping	Negatively worded item
q24_6	Stress coping	Negatively worded item

Data Preparation

The data were prepared and analyzed using R. The cleaned dataset contained 392 valid responses. The original survey variables were renamed into standardized variable codes. The main item variables were coded as q15_1 to q28_8. The first ten item blocks, q15 to q24, represented the ten life-skills dimensions. The q25 to q27 item blocks represented family, school, and social factors, while q28 represented educational environment.

The data preparation process involved the following steps:

1. importing the cleaned Excel dataset into R;
2. standardizing variable names;
3. converting Likert-scale variables into numeric format;
4. reverse coding negatively worded items;
5. calculating composite scale scores;
6. grouping detailed majors into six broader major categories;
7. coding age into an approximate numeric variable for regression analysis;
8. checking missing values and scale consistency; and
9. exporting cleaned data and statistical outputs for verification.
10. The major groups were constructed as follows:

Table 3: Major Group Classification

Major group	Included fields
Business	Business administration, finance, accounting, insurance, marketing, international trade, entrepreneurship, online commerce
Economics	Economics
Law	Law
Technology	Information systems, software engineering, UI/UX engineering, cybersecurity, artificial intelligence
Teacher education	Teacher education programs
Humanities and others	Tourism, hospitality, foreign language education, social innovation, psychology, archive studies, and related fields

Reliability Assessment

Internal consistency was assessed using Cronbach's alpha. Cronbach's alpha evaluates the extent to which items within a scale measure the same underlying construct. The coefficient is defined as:

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{j=1}^{K}\sigma_j^2}{\sigma_T^2}\right), \tag{3.17}$$

where K is the number of items in the scale, σ^2_j is the variance of item j, and σ^2_T is the variance of the total scale score.

The following interpretation rule was used:

Table 4: Cronbach's Alpha Interpretation

Cronbach's α	Interpretation
$\alpha \geq 0.90$	Excellent
$0.80 \leq \alpha < 0.90$	Good
$0.70 \leq \alpha < 0.80$	Acceptable
$0.60 \leq \alpha < 0.70$	Marginal
$\alpha < 0.60$	Weak

In addition to overall reliability, item-deletion diagnostics were used to identify whether any item reduced the internal consistency of its corresponding scale. Particular attention was given to reverse- coded items because negatively worded survey items may behave differently from positively worded items.

Construct Validity and Exploratory Factor Analysis

Construct validity was assessed using exploratory factor analysis and principal component analysis. Before extraction, the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity were used to assess whether the data were suitable for factor analysis.

The Kaiser-Meyer-Olkin statistic measures sampling adequacy. A KMO value above 0.80 is usually considered very good, while a value above 0.90 is considered excellent. Bartlett's test evaluates whether

the correlation matrix differs significantly from an identity matrix. A statistically significant Bartlett's test indicates that the variables are sufficiently correlated for factor analysis.

Principal component analysis with varimax rotation was used to examine the structure of the 60 life- skills items. A 10-component solution was retained because the instrument was theoretically designed to measure ten core life-skills dimensions. Although eigenvalue-based criteria were also considered, the theoretical structure guided the final factor-retention decision.

The factor analysis was used not to create a new measurement instrument, but to examine whether the observed item structure was broadly consistent with the ten-dimensional theoretical framework.

Normality Diagnostics

Normality was examined using both formal tests and distributional indicators. The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to test strict normality. However, because formal normality tests are sensitive to large sample sizes, skewness and kurtosis were also examined.

The following decision rule was used:

$$|\text{Skewness}| < 2, |\text{Kurtosis}| < 7. \quad (3.18)$$

If skewness and kurtosis were within these ranges, the variables were considered acceptable for para- metric statistical tests, even if formal normality tests were statistically significant.

Correlation Analysis

Pearson correlation analysis was used to examine bivariate relationships among the life-skills dimensions and explanatory factors. The Pearson correlation coefficient is defined as:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}}. \quad (3.19)$$

The correlation analysis served three purposes. First, it examined whether the ten life-skills dimensions were positively related to each other. Second, it assessed which life-skills dimensions were most strongly associated with the total life-skills score. Third, it provided an initial check for multicollinearity among the explanatory variables.

Group-Difference Analysis

Group differences were examined using independent-samples t-tests and one-way analysis of variance.

Independent-Samples t-Test

Independent-samples *t*-tests were used to compare male and female students across life-skills dimensions. The test evaluates whether the mean score of one group differs significantly from the mean score of another group.

Because the two gender groups had different sample sizes, Welch's t-test was used. Effect size was assessed using Cohen's *d*:

$$d = \frac{\bar{X}_2 - \bar{X}_1}{s_p}, \quad (3.20)$$

where X_1 and X_2 are the group means and s_p is the pooled standard deviation:

$$s_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}. \quad (3.21)$$

Cohen's d was interpreted as follows:

Table 5: Cohen's d Interpretation

Cohen's *d*	Interpretation
0.20	Small effect
0.50	Medium effect
0.80	Large effect

One-Way ANOVA

One-way ANOVA was used to examine whether life-skills scores differed across groups defined by aca- demic year, GPA, major group, household income, working status, and club membership. The ANOVA model can be written as:

$$Y_{ij} = \mu + \tau_j + \varepsilon_{ij}, \quad (3.22)$$

where Y_{ij} is the life-skills score of student i in group j, μ is the overall mean, τ_j is the group effect, and ε_{ij} is the error term.

Effect size for ANOVA was measured using eta squared:

$$\eta^2 = \frac{SS_{\text{between}}}{SS_{\text{total}}}. \quad (3.23)$$

The following rule was used to interpret eta squared:

Table 6: Eta Squared Interpretation

Eta squared	Interpretation
0.01	Small effect
0.06	Medium effect
0.14	Large effect

When the ANOVA result was statistically significant, Tukey's honestly significant difference post-hoc test was applied to identify which group pairs differed significantly.

Regression Model

Multiple linear regression was used to estimate the association between the explanatory factors and total life skills. The main regression model is specified as:

$$LifeSkillsTotal_i = \beta_0 + \beta_1 FamilyFactor_i + \beta_2 SchoolFactor_i + \beta_3 SocialFactor_i + \beta_4 EduEnvironment_i + \varepsilon_i, \quad (3.24)$$

where $LifeSkillsTotal_i$ is the total life-skills score of students i, $FamilyFactor_i$ is the family factor score, $SchoolFactor_i$ is the school factor score, $SocialFactor_i$ is the social factor score, $EduEnvironment_i$ is the educational-environment score, and ε_i is the error term.

The regression coefficients were interpreted using both unstandardized coefficients and standardized beta coefficients. The unstandardized coefficient shows the expected change in the dependent variable for a one-unit increase in the explanatory variable, holding the other variables constant. The standardized beta coefficient allows comparison of the relative strength of association across explanatory variables.

Regression Diagnostics

Several diagnostics were used to assess the adequacy of the regression model.

First, multicollinearity was examined using the variance inflation factor. The VIF for explanatory variable j is defined as:

$$VIF_j = \frac{1}{1 - R_j^2}, \quad (3.25)$$

where R^2_j is the coefficient of determination obtained by regressing explanatory variable j on the remaining explanatory variables. VIF values below 5 were considered acceptable.

Second, the Durbin-Watson statistic was used to assess residual autocorrelation:

$$DW = \frac{\sum_{i=2}^{n}(e_i - e_{i-1})^2}{\sum_{i=1}^{n} e_i^2}, \quad (3.26)$$

where e_i is the regression residual. A Durbin-Watson value close to 2 indicates no serious autocorrelation.

Hierarchical Regression

Hierarchical regression was used to examine whether family, school, social, and educational-environment factors explain additional variance in total life skills beyond demographic characteristics.

The first model included demographic controls:

$$LifeSkillsTotal_i = \alpha_0 + \alpha_1 Gender_i + \alpha_2 Age_i + \alpha_3 Year_i + \alpha_4 GPA_i + u_i. \quad (3.27)$$

Because academic year and GPA were categorical variables, they were included using dummy variables.

The second model added the four explanatory factors:

$$LifeSkillsTotal_i = \alpha_0 + \alpha_1 Gender_i + \alpha_2 Age_i + \alpha_3 Year_i + \alpha_4 GPA_i + \beta_1 FamilyFactor_i + \beta_2 SchoolFactor_i + \beta_3 SocialFactor_i + \beta_4 EduEnvironment_i + u_i. \quad (3.28)$$

The improvement in model fit was assessed using the change in R2:

$$\Delta R^2 = R^2_{\text{Step 2}} - R^2_{\text{Step 1}}. \quad (3.29)$$

An F -change test was used to determine whether the increase in explained variance was statistically significant.

Skill-Specific Regression Models

In addition to the main regression model, separate regression models were estimated for each of the ten life-skills dimensions. The purpose of these models was to identify whether family, school, social, and educational-environment factors were associated with specific types of life skills.

For each life-skill dimension LS_{ki}, the following model was estimated:

$$LS_{ki} = \gamma_0 + \gamma_1 FamilyFactor_i + \gamma_2 SchoolFactor_i + \gamma_3 SocialFactor_i + \gamma_4 EduEnvironment_i + v_i, \quad (3.30)$$

where LS_{ki} represents one of the ten life-skills dimensions for student i. This model was estimated separately for self-awareness, empathy, communication, interpersonal skills, decision-making, problem- solving, creative thinking, critical thinking, emotion coping, and stress coping.

Ethical Considerations

The study used survey data collected for academic research purposes. The analysis was conducted at the aggregate level, and no individual respondent was identified in the results. The data were processed and reported in a way that protects respondent confidentiality. The findings are presented only in summarized statistical form.

Methodological Limitations

Several methodological limitations should be acknowledged. First, the study is based on cross-sectional survey data; therefore, the findings should be interpreted as statistical associations rather than causal effects. Second, the sample was drawn from one university, which limits the extent to which the results can be generalized to all university students in Mongolia. Third, all

main variables were measured using self-reported responses, which may be affected by social desirability bias, recall bias, or differences in students' self-assessment. Fourth, some subscales showed marginal internal consistency, partly due to the performance of reverse-coded items. Accordingly, the total life-skills score should be regarded as the primary outcome, while subscale-level results should be interpreted with caution. Fifth, some demographic groups, such as the lowest-income group and the teacher education group, had relatively small sample sizes; therefore, group-difference results involving these categories should also be interpreted cautiously.

Despite these limitations, the study provides a systematic quantitative framework for assessing university students' life-skills levels and identifying the family, school, social, and educational-environment factors associated with their development.

Empirical Analysis

This section presents the empirical findings of the study. The analysis is based on survey data collected from 392 university students in Mongolia. The empirical analysis proceeded in six stages. First, the demographic profile of the respondents was examined. Second, descriptive statistics were calculated for the main life-skills dimensions and explanatory factors. Third, reliability analysis and exploratory factor analysis were conducted to evaluate the internal consistency and measurement structure of the survey instrument. Fourth, correlation analysis was used to examine bivariate relationships among the main variables. Fifth, independent-samples t-tests and one-way ANOVA were applied to assess gender and group differences. Finally, multiple regression, hierarchical regression, and skill-specific regression models were estimated to identify the main factors associated with students' life-skills development.

In the regression analysis, the dependent variable is the total life-skills score, while the key explanatory variables are family factor, school factor, social factor, and educational environment. The empirical results are summarized in Tables 7–23.

Demographic Profile of Respondents

The sample consisted of 392 university students. Female students represented 63.8 percent of the sample, while male students accounted for 36.2 percent. Most respondents were first- and second-year students, together representing 71.7 percent of the sample. In terms of academic performance, the largest group reported a GPA between 3.0 and 3.49, followed by students with a GPA between 2.5 and 2.99. Business- related majors represented the largest share of the sample, followed by technology-related majors. Most respondents lived in Ulaanbaatar city, and more than half were not working at the time of the survey. The full demographic profile is reported in Table 7.

Table 7: Demographic Characteristics of Respondents

Variable	Category	*n*	Percent
Gender	Male	142	36.2
Gender	Female	250	63.8
Age	17	1	0.3
Age	18	61	15.6
Age	19	126	32.1
Age	20	92	23.5
Age	21	55	14.0
Age	22	28	7.1
Age	23	7	1.8
Age	24 and above	22	5.6
Year	First year	130	33.2
Year	Second year	151	38.5
Year	Third year	62	15.8
Year	Fourth year	49	12.5
GPA	3.5–4.0	67	17.1
GPA	3.0–3.49	152	38.8
GPA	2.5–2.99	140	35.7
GPA	2.0–2.49	26	6.6
GPA	Below 2.0	7	1.8
Major group	Business	170	43.4
Major group	Technology	87	22.2
Major group	Humanities and others	55	14.0
Major group	Economics	46	11.7
Major group	Law	17	4.3
Major group	Teacher education	17	4.3
Residence	Ulaanbaatar city	310	79.1
Residence	Provincial center	58	14.8
Residence	Soum center	21	5.4
Residence	Rural area	3	0.8
Working status	Full-time working	53	13.5
Working status	Part-time working	112	28.6
Working status	Not working	227	57.9
Club membership	Yes	131	33.4
Club membership	No	261	66.6

Descriptive Statistics

Table 8 reports the descriptive statistics for the main study variables. The total life-skills score was moderately high, with a mean of 3.740 and a standard deviation of 0.401. Among the ten life-skills dimensions, empathy had the highest mean score, followed by self-awareness and interpersonal skills. By contrast, stress coping and emotion coping recorded the lowest mean scores. This suggests that, although students generally reported positive life-skills levels, coping-related skills may require greater attention in university-based student development programs.

Among the explanatory factors, family factor had the highest mean score, followed by school factor, social factor, and

educational environment. The skewness and kurtosis values were generally within acceptable ranges, indicating that the variables did not show severe departures from normality.

Table 8: Descriptive Statistics of Main Variables

Variable	*n*	Mean	Median	SD	Min	Max	Skewness	Kurtosis
Self-awareness	392	3.882	3.833	0.479	1.667	5.000	-0.128	1.768
Empathy	392	3.967	4.000	0.532	1.667	5.000	-0.437	1.182
Communication	392	3.747	3.667	0.612	1.667	5.000	-0.184	-0.128
Interpersonal	392	3.838	3.833	0.540	1.667	5.000	-0.151	0.923
Decision-making	392	3.715	3.667	0.546	1.667	5.000	-0.171	0.445
Problem-solving	392	3.741	3.667	0.499	1.667	5.000	-0.210	1.000
Creative thinking	392	3.639	3.667	0.607	1.667	5.000	0.017	0.469
Critical thinking	392	3.818	3.667	0.543	1.667	5.000	-0.044	0.321
Emotion coping	392	3.561	3.667	0.612	1.333	5.000	-0.278	0.764
Stress coping	392	3.488	3.500	0.613	1.000	5.000	-0.509	1.349
Life skills total	392	3.740	3.717	0.401	1.667	5.000	-0.049	1.946
Family factor	392	3.968	4.000	0.678	1.000	5.000	-0.675	1.239
School factor	392	3.738	3.800	0.625	1.000	5.000	-0.629	1.242
Social factor	392	3.649	3.800	0.664	1.000	5.000	-0.179	0.230
Educational environment	392	3.591	3.625	0.608	1.000	5.000	-0.623	1.618

Reliability and Measurement Properties

The internal consistency of the scales was assessed using Cronbach's alpha. As shown in Table 9, the overall 60-item life-skills scale demonstrated excellent reliability, with Cronbach's $\alpha = 0.934$. The reliability coefficients for most subscales were acceptable or close to the commonly used threshold of 0.70. The family factor and educational environment scales also showed good reliability, while the school factor scale showed relatively lower but still usable internal consistency.

Table 9: Reliability Analysis

Scale	Items	Cronbach's *α*
Self-awareness	6	0.670
Empathy	6	0.722
Communication	6	0.735
Interpersonal	6	0.667
Decision-making	6	0.713
Problem-solving	6	0.602
Creative thinking	6	0.727
Critical thinking	6	0.693
Emotion coping	6	0.727
Stress coping	6	0.692
Family factor	5	0.775
School factor	5	0.642
Social factor	5	0.738
Educational environment	8	0.801
Total life skills	60	0.934

Item-deletion diagnostics indicated that the reverse-coded sixth item of each life-skills subscale tended to reduce reliability. This pattern suggests that negatively worded items may have been interpreted differently by respondents. However, because the total life-skills scale showed excellent reliability and the study was based on a theoretically defined instrument, the original scale structure was retained for the main analysis. The selected alpha-if-item-deleted results are reported in Appendix Table 24.

Exploratory Factor Analysis

Before conducting exploratory factor analysis, sampling adequacy and factorability were assessed. The KMO and Bartlett's test results are reported in Table 10. The Kaiser–Meyer–Olkin value was 0.908, indicating excellent sampling adequacy. Bartlett's test of sphericity was statistically significant, $\chi^2(1770) = 10759.70$, $p < 0.001$, confirming that the correlation matrix was suitable for factor analysis.

Table 10: KMO and Bartlett's Test

Measure	Value
KMO	0.908
Bartlett's χ^2	10759.699
Degrees of freedom	1770
p-value	< 0.001

Principal component analysis with varimax rotation was used to examine the factor structure. A 10-component solution was retained because the measurement instrument was theoretically organized around ten core life-skills dimensions. As shown in Table 11, the rotated 10-component solution explained 55.54 percent of the total variance.

Table 11: Variance Explained by the 10-Component Solution

Statistic	RC5	RC4	RC1	RC2	RC3	RC9	RC7	RC6	RC10	RC8
SS loadings	4.754	4.323	4.198	3.866	3.825	3.254	2.720	2.635	2.190	1.558
Proportion variance	0.079	0.072	0.070	0.064	0.064	0.054	0.045	0.044	0.037	0.026
Cumulative variance	0.079	0.151	0.221	0.286	0.349	0.404	0.449	0.493	0.529	0.555
Proportion explained	0.143	0.130	0.126	0.116	0.115	0.098	0.082	0.079	0.066	0.047
Cumulative proportion	0.143	0.272	0.398	0.514	0.629	0.727	0.808	0.888	0.953	1.000

The eigenvalue results are reported in Table 12. The eigenvalue pattern showed that the first component explained 24.80 percent of the total variance, suggesting the presence of a broad general life-skills factor. Although the Kaiser criterion indicated 13 components with eigenvalues greater than one, the 10-component solution was retained because it was consistent with the theoretical structure of the instrument.

Table 12: First Ten Eigenvalues

Factor	Eigenvalue	Variance (%)	Cumulative variance (%)
Factor 1	14.877	24.795	24.795
Factor 2	3.934	6.557	31.353
Factor 3	2.630	4.383	35.735
Factor 4	2.514	4.190	39.926
Factor 5	2.271	3.785	43.711
Factor 6	1.643	2.738	46.449
Factor 7	1.489	2.482	48.931
Factor 8	1.432	2.387	51.318
Factor 9	1.350	2.250	53.568
Factor 10	1.181	1.968	55.536

The rotated loading patterns are summarized in Table 13. The results provided partial support for the theoretical structure. Several dimensions formed clear clusters, particularly empathy, decision-making, critical thinking, and emotion coping. However, many reverse-coded items loaded together on a separate component, indicating a possible method effect associated with negatively worded survey items. This finding should be considered when interpreting the subscale-level results.

Table 13: Summary of Main Loading Patterns

Theoretical Dimension	Main Component	Interpretation
Self-awareness q15_1–q15_5	RC7	Clear cluster, except reverse-coded item
Empathy q16_1–q16_5	RC5	Clear cluster, except reverse-coded item
Communication	RC3 / RC5	Partial clustering and cross-loading
Decision-making q19_1–q19_5	RC1	Clear cluster, except reverse-coded item
Problem-solving	RC1 / RC9	Mixed loading pattern
Creative thinking q21_1–q21_3	RC6	Partial clustering
Critical thinking q22_1–q22_5	RC9	Clear cluster, except reverse-coded item
Emotion coping q23_1–q23_5	RC4	Clear cluster, except reverse-coded item
Stress coping	RC4 / RC10	Mixed loading pattern
Reverse-coded items	RC2	Possible method factor

Normality Diagnostics

Normality diagnostics are reported in Table 14. The Kolmogorov–Smirnov and Shapiro–Wilk tests were statistically significant for all variables, indicating deviations from strict normality. However, these tests are highly sensitive in relatively large samples. The skewness and kurtosis values were within acceptable ranges, and the sample size was sufficiently large for the use of parametric procedures. Therefore, Pearson correlation, independent-samples t-tests, ANOVA, and linear regression were considered appropriate for the main empirical analysis.

Table 14: Normality Diagnostics

Variable	KS statistic	KS *p*	SW statistic	SW *p*	Skewness	Kurtosis
Self-awareness	0.130	< 0.001	0.952	< 0.001	-0.128	1.768
Empathy	0.108	< 0.001	0.967	< 0.001	-0.437	1.182
Communication	0.101	< 0.001	0.984	< 0.001	-0.184	-0.128
Interpersonal	0.092	0.002	0.971	< 0.001	-0.151	0.923
Decision-making	0.115	< 0.001	0.981	< 0.001	-0.171	0.445
Problem-solving	0.132	< 0.001	0.972	< 0.001	-0.210	1.000
Creative thinking	0.120	< 0.001	0.973	< 0.001	0.017	0.469
Critical thinking	0.127	< 0.001	0.976	< 0.001	-0.044	0.321

Emotion coping	0.125	< 0.001	0.974	< 0.001	-0.278	0.764
Stress coping	0.102	< 0.001	0.969	< 0.001	-0.509	1.349
Life skills total	0.070	0.045	0.975	< 0.001	-0.049	1.946
Family factor	0.131	< 0.001	0.948	< 0.001	-0.675	1.239
School factor	0.126	< 0.001	0.960	< 0.001	-0.629	1.242
Social factor	0.102	< 0.001	0.975	< 0.001	-0.179	0.230
Educational environment	0.136	< 0.001	0.954	< 0.001	-0.623	1.618

Correlation Analysis

Table 15 shows the correlations between total life skills and the main life-skills dimensions and explanatory factors. All ten life-skills dimensions were positively associated with the total life-skills score.

The strongest correlations were observed for problem-solving, decision-making, communication, inter- personal skills, creative thinking, and stress coping. Among the explanatory factors, family factor had the strongest correlation with total life skills, followed by school factor, educational environment, and social factor.

Table 15: Correlations with Total Life Skills

Variable	Correlation with life skills total
Problem-solving	0.791
Decision-making	0.765
Communication	0.752
Interpersonal	0.739
Creative thinking	0.731
Stress coping	0.731
Self-awareness	0.716
Critical thinking	0.692
Empathy	0.636
Emotion coping	0.634
Family factor	0.465
School factor	0.375
Educational environment	0.360
Social factor	0.258

The correlations among the four explanatory variables were moderate, as shown in Table 16. This indicates that the variables are related but not highly overlapping. Therefore, multicollinearity was unlikely to be a serious concern in the regression analysis.

Table 16: Correlations among Explanatory Factors

Variable	Family factor	School factor	Social factor	Educational environment
Family factor	1.000	0.461	0.483	0.380
School factor	0.461	1.000	0.474	0.557
Social factor	0.483	0.474	1.000	0.346
Educational environment	0.380	0.557	0.346	1.000

Gender Differences in Life Skills

Independent-samples t-tests were conducted to examine whether life-skills scores differed by gender. As reported in Table 17, female students scored significantly higher than male students in empathy, communication, and interpersonal skills. The effect sizes were small to moderate. No statistically significant gender difference was found for total life skills or for the remaining life-skills dimensions.

Table 17: Gender Differences in Life Skills

Variable	Male mean	Female mean	*t*	df	*p*-value	Cohen's d	Result
Self-awareness	3.871	3.889	-0.333	246.276	0.739	0.037	Not significant
Empathy	3.810	4.056	-4.370	265.474	< 0.001	0.474	Female higher
Communication	3.593	3.834	-3.658	258.043	< 0.001	0.401	Female higher
Interpersonal	3.732	3.898	-2.809	253.764	0.005	0.310	Female higher
Decision-making	3.710	3.718	-0.135	276.175	0.893	0.014	Not significant
Problem-solving	3.692	3.769	-1.479	307.516	0.140	0.153	Not significant
Creative thinking	3.627	3.647	-0.302	266.679	0.763	0.033	Not significant

Critical thinking	3.811	3.821	-0.178	281.262	0.859	0.019	Not significant
Emotion coping	3.612	3.533	1.208	279.334	0.228	-0.129	Not significant
Stress coping	3.433	3.519	-1.313	275.586	0.190	0.141	Not significant
Life skills total	3.689	3.768	-1.809	257.653	0.072	0.198	Not significant

Group Differences

One-way ANOVA was used to examine whether life-skills scores differed by academic year, GPA, major group, income, working status, and club membership. Table 18 reports the statistically significant results. GPA was the most consistent grouping variable associated with life-skills differences. Students with higher GPA levels tended to report stronger communication, interpersonal skills, problem-solving, stress coping, critical thinking, and total life skills. Club membership was significantly associated with creative thinking and communication. Income, major group, and working status also showed selected significant differences. However, most eta-squared values were small, indicating that the practical magnitude of group differences was limited.

Table 18: Significant ANOVA Results

Group	Outcome	*F*	df1	df2	*p*-value	η^2
Club membership	Creative thinking	10.802	1	390	0.001	0.027
Club membership	Communication	6.397	1	390	0.012	0.016
GPA	Communication	7.708	4	387	< 0.001	0.074
GPA	Interpersonal	4.753	4	387	0.001	0.047
GPA	Life skills total	4.526	4	387	0.001	0.045
GPA	Empathy	4.196	4	387	0.002	0.042
GPA	Problem-solving	3.064	4	387	0.017	0.031
GPA	Stress coping	2.926	4	387	0.021	0.029
GPA	Critical thinking	2.408	4	387	0.049	0.024
Income	Decision-making	3.169	4	387	0.014	0.032
Income	Life skills total	3.037	4	387	0.017	0.030
Income	Critical thinking	2.979	4	387	0.019	0.030
Income	Communication	2.927	4	387	0.021	0.029
Income	Interpersonal	2.544	4	387	0.039	0.026
Income	Problem-solving	2.507	4	387	0.042	0.025
Major group	Self-awareness	2.850	5	386	0.015	0.036
Working status	Self-awareness	3.272	2	389	0.039	0.017
Working status	Creative thinking	3.034	2	389	0.049	0.015

Tukey post-hoc tests further clarified the source of selected group differences. As shown in Table 19, students with higher GPA levels generally reported stronger life skills than students with lower GPA levels. Teacher education students reported higher self-awareness than students in several other major groups. Income-related differences were less consistent and should be interpreted cautiously, particularly because the lowest-income group was small.

Table 19: Selected Tukey Post-hoc Comparisons

Group	Outcome	Significant comparison	Difference	Adjusted *p*
GPA	Empathy	2.0–2.49 vs 3.5–4.0	-0.373	0.018
GPA	Empathy	2.0–2.49 vs 3.0–3.49	-0.321	0.033
GPA	Communication	2.5–2.99 vs 3.5–4.0	-0.428	< 0.001
GPA	Communication	2.0–2.49 vs 3.5–4.0	-0.526	0.001
GPA	Communication	2.5–2.99 vs 3.0–3.49	-0.200	0.034
GPA	Interpersonal	2.0–2.49 vs 3.5–4.0	-0.345	0.041
GPA	Interpersonal	Below 2.0 vs 3.5–4.0	-0.707	0.008
GPA	Interpersonal	Below 2.0 vs 3.0–3.49	-0.593	0.033
GPA	Problem-solving	2.0–2.49 vs 3.5–4.0	-0.324	0.038

GPA	Life skills total	2.5–2.99 vs 3.5–4.0	-0.178	0.022
GPA	Life skills total	2.0–2.49 vs 3.5–4.0	-0.280	0.019
Major group	Self-awareness	Business vs Teacher education	-0.382	0.020
Major group	Self-awareness	Humanities/others vs Teacher education	-0.424	0.017
Major group	Self-awareness	Law vs Teacher education	-0.539	0.012
Income	Communication	Above 3,000,000 MNT vs 2,000,001–3,000,000 MNT	0.208	0.041
Income	Decision-making	Above 3,000,000 MNT vs below 500,000 MNT	0.924	0.028
Working status	Self-awareness	Not working vs full-time working	-0.179	0.038

Multiple Regression Results

A multiple linear regression model was estimated to examine the factors associated with total life skills. The model included family factor, school factor, social factor, and educational environment as explanatory variables. As reported in Table 20, the model was statistically significant, $F(4, 387) = 35.117$, $p < 0.001$, and explained 26.6 percent of the variance in total life skills.

Family factor showed the strongest positive association with total life skills. Educational environment and school factor were also statistically significant and positively associated with total life skills. Social factor was not statistically significant after controlling for the other explanatory variables. This result suggests that students' life-skills development is more strongly associated with family support, school- related conditions, and the educational environment than with broader social factors.

Table 20: Multiple Regression Results for Total Life Skills

Explanatory variable	*B*	Standard error	*t*	*p*-value	Standardized *β*
Family factor	0.211	0.031	6.796	< 0.001	0.358
School factor	0.089	0.037	2.411	0.016	0.139
Social factor	-0.021	0.032	-0.661	0.509	-0.035
Educational environment	0.105	0.035	2.977	0.003	0.159
Model summary: $R = 0.516$, $R^2 = 0.266$, Adjusted $R^2 = 0.259$, $F(4, 387) = 35.117$, $N = 392$.					

Regression diagnostics are reported in Table 21. The variance inflation factor values ranged from 1.461 to 1.743, indicating no serious multicollinearity problem. The Durbin–Watson statistic was 2.051, suggesting no evidence of residual autocorrelation.

Table 21: Regression Diagnostics

Diagnostic	Value
VIF: Family factor	1.461
VIF: School factor	1.743
VIF: Social factor	1.462
VIF: Educational environment	1.496
Durbin–Watson statistic	2.051
Durbin–Watson p-value	0.693

Hierarchical Regression Results

Hierarchical regression was conducted to examine whether the four explanatory factors added predictive power beyond demographic variables. In Step 1, demographic variables explained 7.3 percent of the variance in total life skills. In Step 2, after adding family factor, school factor, social factor, and educational environment, the explained variance increased to 29.9 percent.

As shown in Table 22, the four explanatory factors added approximately 22.5 percentage points of explained variance beyond demographics. The model comparison was statistically significant, indicating that family, school, social, and educational-environment factors provide meaningful explanatory power beyond students' demographic characteristics.

Table 22: Hierarchical Regression Results

Model	R^2	Adjusted R^2	F	df1	df2	Model comparison
Step 1: Demographics	0.073	0.052	3.365	9	382	–
Step 2: Demographics + factors	0.299	0.275	12.385	13	378	$\Delta F = 30.353$, $p < 0.001$

Skill-Specific Regression Results

Separate regression models were estimated for each of the ten life-skills dimensions. As shown in Table 23, all ten models were statistically significant. The results provide a more detailed picture of how the explanatory factors are associated with different dimensions of life skills.

Family factor showed the most consistent association, with a statistically significant positive relation- ship across all ten dimensions. School factor was significantly associated with empathy, interpersonal skills, and decision-making. Educational environment was significantly associated with interpersonal skills, problem-solving, emotion coping, and stress coping. Social factor was not statistically significant in any of the skill-specific models after controlling for the other explanatory variables.

These results suggest that family-related support plays a broad role in students' life-skills development, while school and educational-environment factors are more strongly associated with selected interpersonal, cognitive, and coping-related skills.

Table 23: Skill-Specific Regression Results

Skill	R^2	Adj. R^2	$^{\beta}$Family	$^{\beta}$School	$^{\beta}$Social	$^{\beta}$Edu	Main significant predictors	Model p
Self-awareness	0.084	0.075	0.232***	0.061	0.012	0.035	Family	< 0.001
Empathy	0.124	0.115	0.142*	0.221***	-0.023	0.081	Family, School	< 0.001
Communication	0.208	0.200	0.316***	0.097	0.065	0.085	Family	< 0.001
Interpersonal	0.205	0.197	0.326***	0.119*	-0.057	0.145**	Family, School, Edu. environment	< 0.001
Decision-making	0.161	0.152	0.302***	0.179**	-0.107	0.061	Family, School	< 0.001
Problem-solving	0.123	0.114	0.197***	0.044	-0.007	0.195***	Family, Edu. environment	< 0.001
Creative thinking	0.131	0.122	0.270***	0.113	-0.006	0.052	Family	< 0.001
Critical thinking	0.124	0.115	0.274***	0.105	0.008	0.025	Family	< 0.001
Emotion coping	0.091	0.081	0.162**	-0.020	-0.039	0.232***	Family, Edu. environment	< 0.001
Stress coping	0.217	0.209	0.331***	0.085	-0.092	0.209***	Family, Edu. environment	< 0.001

Notes: Standardized beta coefficients are reported. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Summary of Empirical Findings

The empirical results provide several important findings. First, the overall life-skills level of university students was moderately high, although coping-related skills were relatively weaker than other dimensions. Second, the measurement instrument demonstrated strong overall reliability, with excellent in- ternal consistency for the total life-skills scale. Third, the exploratory factor analysis provided partial support for the theoretical structure of the instrument, while also indicating a possible method effect caused by reverse-coded items.

Fourth, gender differences were observed in selected interpersonal dimensions. Female students re- ported significantly higher levels of empathy, communication, and interpersonal skills, although there was no significant gender difference in total life skills. Fifth, GPA was the most consistent demographic variable associated with life-skills differences, suggesting that students with stronger academic performance also tend to report stronger life-skills development.

Finally, the regression results show that family factor has the strongest and most consistent association with students' life skills. School factor and educational environment are also positively associated with total life skills, while social factor does not remain statistically significant after controlling for the other explanatory variables. Overall, the findings suggest that university students' life-skills development is more closely associated with family support, school-related conditions, and the broader educational environment than with social factor alone.

Conclusion

This paper examined the factors associated with university students' life skills using survey evidence from Mongolia. The findings show that the surveyed students reported a moderately high level of overall life skills. Among the ten dimensions, empathy and self-awareness recorded the highest mean scores, whereas stress coping and emotion coping recorded the lowest scores. This pattern suggests that students may need stronger institutional support in managing stress, regulating emotions, and coping with psychological pressure.

The measurement results indicate that the overall 60-item life-skills scale has excellent internal consistency, although some subscales showed weaker reliability due partly to reverse-coded items. Accordingly, the total life-skills score is treated as the primary empirical outcome, while dimension-specific findings are interpreted as supplementary evidence and should be treated with caution.

The main empirical finding is that family factor has the strongest and most consistent association with students' life skills. Family

factor remained statistically significant in the multiple regression model and was positively associated with all ten dimensions in the skill-specific models. Educational environment and school factor were also positively associated with total life skills, although their associations were smaller and more selective. By contrast, social factor did not show a statistically significant unique association after controlling for family, school, and educational-environment factors.

The group-difference results provide additional insights. Female students reported higher empathy, communication, and interpersonal skills than male students, although total life skills did not differ significantly by gender. GPA was the most consistent demographic variable associated with differences in life-skills scores, while club membership and working status were related to selected dimensions such as communication, creative thinking, and self-awareness.

These findings have several implications for higher education practice in Mongolia. Universities should integrate life-skills development more explicitly into curricula, student-development policies, counselling services, mentoring systems, extracurricular activities, and practical learning opportunities. Particular attention should be given to stress coping and emotion coping, as these were the weakest dimensions in the descriptive results. Because family factor showed the strongest association with life-skills outcomes, universities should also strengthen student-support systems for those who may have weaker family sup- port, including counselling, mentoring, peer-support, and academic-advising services.

This study has several limitations. The analysis is based on cross-sectional and self-reported survey data; therefore, the findings should be interpreted as associations rather than causal effects. The sample was drawn from one university, which limits generalizability to all university students in Mongolia. In addition, some subscales and demographic groups require cautious interpretation due to marginal reliability and small group sizes.

Future research could use longitudinal or comparative designs to examine how students' life skills develop over time and across institutions. Further studies could also refine the measurement instrument by revising problematic reverse-coded items and incorporating qualitative evidence on how students understand and develop life skills.

Overall, the evidence suggests that life-skills development among the surveyed university students is associated with family support, institutional learning conditions, and selected demographic and experiential factors. For Mongolian higher education, strengthening students' communication, decision-making, problem-solving, emotional regulation, and coping capacities is essential for supporting their academic, professional, and social development.

A Additional Reliability Diagnostics

Table 24: Selected Alpha-if-Item-Deleted Results for Reverse-Coded Items

Scale	Current α	Reverse-coded item	α if deleted
Self-awareness	0.670	q15_6_r	0.773
Empathy	0.722	q16_6_r	0.805
Communication	0.735	q17_6_r	0.744
Interpersonal	0.667	q18_6_r	0.701
Decision-making	0.713	q19_6_r	0.788
Problem-solving	0.602	q20_6_r	0.751
Creative thinking	0.727	q21_6_r	0.798
Critical thinking	0.693	q22_6_r	0.773
Emotion coping	0.727	q23_6_r	0.807
Stress coping	0.692	q24_6_r	0.738

Data Availability

The data used in this study were collected through a survey of university students at the University of Finance and Economics (UFE) in Mongolia. The dataset includes demographic characteristics, life-skills indicators, and explanatory factors related to family, school, social context, and educational environment. The data are not publicly available due to confidentiality considerations but may be obtained from the corresponding author upon reasonable request.

Ethics Statement

The study used survey data collected for academic research purposes. Participation was voluntary, and the analysis was conducted at the aggregate level. No individual respondent is identified in the manuscript. The data were processed and reported in a manner that protects respondent confidentiality.

Use of Generative-AI tools Declaration

During the preparation of this manuscript, the authors used ChatGPT for language polishing and expression improvement. All AI-assisted content was critically reviewed by the authors.

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