sciendo

Acta Educationis Generalis
Volume 12, 2022, Issue 3

DOI: 10.2478/atd-2022-0025

Using Factor Analysis as a Tool for Measuring the Quality of Life of University Students

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Received: June 15, 2022; received in revised form: August 1, 2022;
accepted: August 15, 2022

Abstract:

Introduction: The aim of this research is to design a tool (a scale) for measuring the quality of life of university students and to copy down its validity, use and reliability on six-dimension academic achievement: it touches family life quality, social life quality, personal happiness, life satisfaction and mental health.

Methods: 963 male and female students from the Faculty of Social Sciences, Department of Psychology, for the academic year 2018/2019 were exposed to the application of the model (factor analysis) and the reliability coefficient was reached by using Roland and Kettmann equation (.773) and Spearman-Brown (.776) and Cronbach's Alpha (.629).

Results: The feedbacks show that this tool for measuring 'Quality of University Student Life' is characterized and described as a good degree of stability.

Discussion: When using "factor analysis" tool, we conclude that the exit dimensions focus on two basic axes: the first axis related to public health, quality of education, Family life, life satisfaction, and mental health. The second one consists of the quality of social life and personal happiness. Since these results have given a good degree to some extent, we were commended for working in favour of this tool (a scale) to judge the life quality of university students majoring in psychology faculty at the university.

Limitations: The research and the questionnaire of the tool were applied to a group of psychology students at the national level which includes 963 male and female students with a percentage of 23.98%.

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The questions of this tool were tested on a sample of 963 students at the national level who were randomly chosen from various disciplines of master's degree in psychology. Research was conducted during the academic year 2018/2019.
Conclusions: The targeted instrument designed in this research which is "the factor analysis" has achieves a good validity and stability and has driven to two basic scales.

Key words: factorial structure, measurement, quality of life.

Introduction

In many ancient researches on psychological behaviour have shown different variables connected with many disorders and damages originated from individuals in their incapability and inefficiency when analysing themselves and their circumstances (Baltes & Heydens-Gahir, 2003; Sauter, Murphy, & Hurrell, 1992), the development of society and its difficulties, and the progression of individual and social interaction and interference that cannot be changed nor stopped (Shanahan et al., 2022). Nevertheless, psychologists around the globe, with the assistance and support of the National and International Conference on Psychiatry and Social Perversions (NICPM) (Unger, 2004), plus the getting to know people and teach them the most essential life skills and behaviour, preparing them, especially the younger next generation, to face the challenges and solve problems in life within themselves, others and surrounding people (Belkadi, Othman, Mohamed, Abdelhafid & Mohamed, 2015). For Baltes (2003), psychological issues within individuals support them to avoid them until what is known as positive psychology has appeared, which works on the positive aspects and focuses on the strengths of individuals to use them and treat and heal weaknesses and disorders accompanying it (Baltes & Heydens-Gahir, 2003; Sauter et al., 1992).

Within the same idea, Hermenaau (2015) studied the fact that psychologists have neglected for a long time the positive features of personality, and all attention was on the negative aspects, until the time came and appeared in the field of positive psychology which is defined as the study of quality of life and what is related to it has dimensions and many prospects (Hermenau, Eggert, Landolt, & Hecker, 2015), variables which means derives, and training programmes. Similary (Frisch, 2005; Huebner, Suldo, Smith, & McKnight, 2004a), it indicates that there are a great number of psychologists who have been working on positive subjective experiences and personality features, succeeded to develop many new ways to improve the quality of life, make life valuable and meaningful, and avoid pathological symptoms that occur when life is meaningless (Lane, 1994; Rodrigues et al., 2020; Sprangers & Schwartz, 1999)

also it is mentioned that the word of quality of life is one of the domains of psychology which plays an major role in researching, developing and improving human behaviour and leads to the contribution to achieving or not achieving the quality of the environment that surrounded the person and the services that are offered to him (Diener & Suh, 1997; Felce & Perry, 1995; Benbernou, Bennama, Belkadi, Boukchiche, & Koutchouk, 2022; Hofstede, 1984; King, Dordel, Krzic, & Simard, 2014).

In the same idea Frisch (2005), said that the concept quality of life is one of the contemporary terms in the domain of psychology, which focuses on what is known as positive psychology, which was introduced for the first time to the academic studies in psychology in 1998. So, the scientific study of the emotions, feelings and positive personality traits of persons and institutions has begun, all leads to the contribution to the well-being achievement, happiness and life enjoyment (Diener & Chan, 2011; Diener, Oishi, & Lucas, 2003; Sarvimäki & Stenbock-Hult, 2000). For this it has a strong relation with individual's highest degree of life satisfaction, plus reaching happiness and above all a higher level of quality of life, which the World Health Organization (Organization, 2001) has defined it as "the individual's awareness" of his situation in life in the context of the culture and the value systems in which believes and the extent to which this corresponds or does not match with: his goals, expectations, values, and interests related to his physical health, psychological state, level of independence, social relations, personal beliefs, and his relationship with the environment in general. Thus, the quality of life in this sense refers to the individual's subjective evaluations of his life circumstances (Hofstede, 1984).

In addition to this, there is a link between the individual in terms of his internal personal entity that is shown on his judged external behaviour (Chrara, Raoui, Belkadi, Hocine, & Benbernou, 2018; Markus & Kitayama, 1991). Here we can make relation between a person's personality and his points of view of the life issues and his reactions and feedbacks to life situations the negative one or the positive. Reactions are based on his beliefs, points of view, ideas and ideological cultural composition and background. This discrepancy and distinction between individuals are due to their view of this thing on one hand, and on the other hand, its personal, cultural and ideological composition. This is why, our interferences and decisions must be flexible in the presentation and had a balance in the analysis of issues when disagreeing with the others. To solve the problem, we should respect for the opinions, ideas and points of view of others. This is applicable to every person living in the society, and the majority are intellectual people who undertake training sessions based on curricula and programmes that have aims and objectives, these goals must be embodied through a well-constructed plan that is planned systematically taking int consideration the elements that we have mentioned (Belkadi, Mokhtar, Abdelkader, Mohamed, &

Othman, 2019). These training programmes work in university training so that the students in the final stage of entering the world of work. We must nurture in it the spirit of initiative, courage and a positive spirit, that is to say, that the student enjoys a quality of life that meets their psychological, spiritual, mental, environmental and social needs through providing them with knowledge, instilling positive trends, developing life skills, and enjoying them inside and outside the university in its present and future, by utilizing the capabilities of the university institution, family and society. In the same idea, he noted that the quality of learners' lives is affected in many sides, through the quality of the school environment, the quality of education, the quality of family life, the quality of health care, and the quality of community life, and that the intelligences are used to solve the problems of daily life, and in the academic field, and that these intelligences (Adel & Mohammed, 2017). It can help the individual to deal with life situations and understand them from many points of view (Benhammou et al., 2021; Diener et al., 2003). And the quality of life, as we mentioned, varies with the change of individuals and the situations in which they are in, it is the life enjoyment, and this is the individual's feeling of satisfaction, happiness and well-being. At the end, it is to live a life free of behavioural, psychological and health disturbances and anxiety. It is to feel secure, stable and comfortable so that he serves himself and the environment, in which he lives (Benchehida et al., 2021; Diener & Chan, 2011; Huebner et al., 2004a; Lane, 1994).

The concept quality of life has been tackled from various and multiple aspects such as health, psychological, social, economic, academic, and religious and other domains (Sarvimäki & Stenbock-Hult, 2000). As for the scientific research level, it is a relatively new concept, as lot of studies connected to quality of life have been done and differed in terms of its importance and purpose (Lane, 1994; Sarvimäki & Stenbock-Hult, 2000; Sprangers & Schwartz, 1999), ages and conditions related to individuals, including mental, psychological and other health and academic achievement sides, some of which emphasized on knowing the degree of quality of life for university students (Al-Qaisy, 2011; Becker & Luthar, 2002; Gillespie, Walsh, Winefield, Dua, & Stough, 2001; Huebner, Suldo, Smith, & McKnight, 2004b; Markus & Kitayama, 1991), which found and agreed that there is a difference in the degree of quality of life within the students sample and a discrepancy between its dimensions (domains). There are those who related it to many other variables, including the study of Al-Qaisy (2011) in which they marked that with regard to the students life quality in the educational domain, it is important to mention a series of criteria and indicators that the tasks and procedures aiming at developing and achieving the educational aspect flow into. Hence, it is necessary to know a lot of elements affecting the educational process for university students (mental and mental abilities, physical

capabilities, skill capabilities, orientations and ambitions, as well as motives and personality (Anwar & Louis, 2017; Leong & Ahmadi, 2017; Mohammed, Bachir, Eddine, & Adel, 2018; Peytcheva-Forsyth, Yovkova, & Aleksieva, 2018).

Measurement of quality of life is highly connected to accurate and exact knowledge of the changes that make it up, depending on the person's field and it's interests and likes, as well as the needs of the profession he works on or the domain he occupies (Diener & Suh, 1997b; Hyde, Wiggins, Higgs, & Blane, 2003; Mohammed, Mokrani, & Belkadi, 2019; Wehmeyer & Schwartz, 1998), that confirmed the highly degree measure of the quality of life which depends on the accurate description of the good life, and consequently, the students' perceptions of the quality of life affects their academic performance (studies), and their motivation to achieve and achieve their subjective and objective aims, and this stage is considered (Belkadi, Alia, & Mohammed, 2020; Hyde et al., 2003). These are the most essential educational stages that affect students' views of life quality, as they prepare to join various professions, marriage and family stability (Daugherty & Funke, 1998; Golde & Dore, 2001; Sheehan, Sheehan, White, Leibowitz, & Baldwin, 1990; Sheehan et al., 1990). Thus, it is noticed that delving into any field is a definite loss if we do not know it and we should study it deeply to make the appropriate arrangements to delve into it. Here, it comes with adulthood by preparing it for the world of work, so we must know the variables of training, the variables of the environment, and the variables of the world of work (profession), working them all together, we can achieve it from all sides and at all levels. Lastly we can come with the extent of the interdependence and interrelation that exists between the quality of life and life skills (Belkadi et al., 2015). When an person can solve a life situation issue, he inevitably surely feels happy and psychological comfort, therefore his skill and abilities in overcoming life's problems gave him a feeling of comfort and strength of character and personality, and thus positive happiness (Abdelkader, Madani, Adel, & Bouabdellah, 2018; Diener & Chan, 2011). There are various studies that have related the idea of life skills and quality of life, taking into consideration the research of Stanford Ruben and others. Its aim is to assess changes in life skills and quality of life sorting from rehabilitation services for the disabled. Through the study of Behroz-Sarcheshmeh, Karimi, Mahmoudi, Shaghaghi, and Jalil-Abkenar (2017) the effect of training of life skills on social skills of high school students with intellectual disabilities was examined. Moreover, we have noticed that within the bound limits of our knowledge, the lack of studies and researchers that combined the two variables, especially among university students (Yassin Zenati, Belkadi, & Benbernou, 2021).

Through all what we have said above, it summed up by stating that the characteristics of the progress for each nation or people are measured by its

civilization and what it is offered to man and humanity. Consequently, the Algerian university is now trying to catch up with the world, and make up for what it missed, relying on and believing in its ability and its role in building its glory by preparing young people who are able to protect it and protect themselves first within the sophistication and quality of modern life.
The purpose of this study is to develop a tool for measuring the quality of life of university students, and to report its validity and reliability on six dimensions: academic achievement, family life quality, social life quality, personal happiness, life satisfaction, and mental health.

1 Method

1.1 Participants

The descriptive method was used in a survey format for its suitability to the type of the study and research.
The research sample is psychology university students majoring the second grader of master's degree in various sub-disciplines of psychology. The researchers relied on twenty (n=20) Algerian universities which were randomly selected by researchers. The total number of participants in this study (n=4016) male and female who have enrolled in social sciences during the academic year (2018/2019). The researcher has chosen a random sample from the target population of 963 male and female students, representing 23.98% of the population of psychology university students majoring in different branches of master's degree year two.

1.2 Statistical analysis

The researchers used questionnaires to investigate the quality of life of university students who enrolled in Psychology discipline.

2 Results

Table 1

Validity of the measurement tool

Number	*Axes*	*Arithmetic mean*	*Standard deviation*	*Correlation coefficient*	*Indication*
01	Public health quality	36.9667	4.62846	.354	Statistically significant
02	Quality of education and study (academic)	37.0333	6.05054	.648	Statistically significant
03	Family quality of life	49.0333	6.38050	.590	Statistically significant
04	Quality of social life	33.1500	7.26222	.627	Statistically significant
05	Personal happiness	42.0000	5.80473	.746	Statistically significant

06	Life satisfaction	35.5833	5.10995	.636	Statistically significant
07	Psychological health	44.1000	7.75187	.783	Statistically significant
	The tool as a whole	277.8667	27.53024	1	-

1 - Correlation of the total score of the axis with the total score of the tool
Note: - 0.01. **At the level of significance

It is shown above clearly that the correlation coefficients of the total degrees of the axis with the total degree of the tool are statistically significant at the level of indication of validity "significance" (0.01). Thus, it becomes clear that the tool is characterized by a good degree of internal consistency, meaning that the tool measures what it was aimed to do.

2.1 Tool stability calculator

Stability was calculated by half-splitting using the Cronbach's Alpha, Roland and Kettmann and Spearman - Brown equation, calculating the stability for each axis and for the quality of life tool as a whole. The results were as follows:

Table 2

The stability coefficients by the split-half method for each axis

Tool axes	*Public health quality*	*Quality of education and study (academic)*	*Family quality of life*	*Quality of social life*	*Personal happiness*	*Life satisfaction*	*Psychological health (psychological dimension)*
Cronbach's Alpha	.478	.186	.502	.439	.349	.436	.558
Roland and Kettman	.345	.315	.669	.612	.517	.609	.716
Spearman-Brown	.310	.310	.669	.610	.512	.604	.716

Obviously and from the obtained results in Table 2 (statistically significant), this indication is in all dimensions of quality of life according to the Cronbach's alpha equation, which merged between .186-.558 and Roland and Kettmans and ranged between .315-.716 and according to Spearman Brown ranged between .310-.716. It can be concluded that all dimensions of quality of life are characterized by a good degree of stability.

Table 3

Half-segment stability coefficients for the quality of life tool

	Roland and Kettman	*Spearman - Brown*	*Cronbach's Alpha*	*Indication*
The value obtained	.629	.776	.773	Statistically significant

The obtained results are as shown in the previous table, by using the Roland and Kettman equation (.629,) and Spearman - Brown (.776) and Cronbach's Alpha (.773), indicate that the tool 'University student quality of life' has good stability.

3 Discussion

Table 4

Descriptive statistics based on the mean and standard deviation of the quality of life scale

	Average	*Standard deviation*	*Sample*
Public health quality	3.2422	.51123	963
Quality of education and study	3.4250	.54813	963
Family quality of life	4.1999	.70050	963
Quality of social life	3.9728	.51936	963
Personal happiness	3.7739	.66896	963
Life satisfaction	3.2965	.55157	963
Psychological Health	3.7206	.65541	963
Public Health	3.2422	.51123	963

The above table shows the results of the descriptive statistics of quality-of-life six-dimensions, as well as the sample size adopted in the research.
We calculate the correlations between a group of elements of the quality-of-life measure, then we get a matrix of correlations between these elements, then we analyse the correlation matrix factorially. Finally, we explore the nature of the concentration of elements or dimensions of quality of life.

Table 5

The correlation matrix for quality of life elements

Dimensions	*Public Health*	*Education*	*Family*	*Social quality*	*Happiness*	*Satisfaction*	*Health*
Public health quality		.211	.217	.107	.146	.022	.339
Quality of education and study			.271	.214	.222	.298	.312
Familyquality of life				.141	.120	.372	.385
Quality of social life					.466	.204	.261
Personal happiness						.209	.271
Life satisfaction							.458
Psychological health							

It is clear from the table that the obtained matrix of inter-correlation coefficients, which was greater than 0.0001 for this we supports the targeted study to keep all the dimensions of quality of life.

The following table shows the results of two basic tests, the first test Kayes-Mayer-Olkin (KMO), which proves the adequacy of the sample, which must be greater than 0.6 and the (Bartlett) test for the sake of correlation between the variables that was interpreted by the statistical significance. The aim of this items was to find out the validity or the non-validity of the data and the sample number.

Table 6

Kaiser-Meyer-Olkin Index (KMO) and Bartlett's test

Index for measuring sampling quality	Kaiser-Meyer-Olkin	.764
Bartlett's sphericity test	Chi-square approx.	1093.480
	Ddl	21
	Significance	.000

We notice from the shown results in the above table that the obtained results of the Case-Meyer-Olkin test, that is to say, the measurement value (KMO) reached (.764) which is greater than the reference value 0.6 which is a good indicator. Moreover, we find that the value of the significance level of Bartlett test is equal to zero (0.000) Therefore it functions, and this confirms the existence of a statistically significant relationship and once again is a good indicator, which allows us to use factor analysis successfully.

Table 7

The quality of representation of the dimensions of quality of life

	Representation of qualities	
	The quality of the representation of the elements	
	Initials	*Extraction*
Public Health	1.000	.322
Quality of education	1.000	.358
Family life	1.000	.521
Social life	1.000	.718
Personal happiness	1.000	.717
Life satisfaction	1.000	.513
Psychological life	1.000	.595

Through the shown results in the previous table and the used method (principal component analysis). Which gives us the qualitative value of representing the dimensions of quality of life, the qualitative value of the dimension of public health and the quality of education was not good because it was less than 0.4, but all the remaining dimensions were more than 0.4, which means that they are good and we obtained the interpreted variance values. From the foregoing, it is clear that all the conditions for using factor analysis as a tool are available, and therefore we can apply it as a research reference. The presented the table indicates that eight values, which shows the quantity of variance and dispersion ratios, which is known as 'explained variance'.

Table 8

The percentages of variance explained by the factors

Component factors	*Initial values*			*Sums taken from the square of the loadings*		
	Total	*% of variance*	*% cumulative*	*Total*	*% of variance*	*% cumulative*
Public Health	2.582	36.889	36.889	2.582	36.889	36.889
Quality of education	1.162	16.595	53.484	1.162	16.595	53.484
Family life	.840	12.000	65.484			
Social life	.747	10.665	76.149			
	.633	9.046	85.194			
Personal	.529	7.562	92.756			
happiness	.507	7.244	100.000			

It is worthy noticed that there are two factors, and that their in-kind value is greater than one, the interpretation percentages of the discrepancies were

achieved from the total variance of each factor. So, it explains about 53.484% of the total information. Also, the value of the explained variance for the first component equals 2.582 of the total variances, it explains the factors constituting the scale with a percentage of 36.889%. As for the value of the explained variance for the second component, equals to 1.162 of the total variances, it explains the factors constituting the scale at a rate of 53.484%.

Table 9

Saturation of the factors before rotation

	Component matrix	
	Component	
	1	*2*
Social health	.496	
Quality of education	.595	
Quality of family life	.602	
Quality of social life	.542	.651
Personal happiness	.553	.642
Life satisfaction	.676	
Psychological life	.750	

It is clearly shown from the obtained results that the matrix of factors before the rotation includes two factors. They are related to each other in a sequential form. The first factor includes all the dimensions or elements in different proportions, while the second factor includes only two dimensions or two factors, namely the quality of social life and personal happiness. Therefore, the dimension component before rotation can include even factors or constitute two explanatory factors for a quality scale. The life of university students, and this is all before the factors rotate.

Table 10

Saturations of the factors after rotation

	Component retation matrix	
	Component	
	1	*2*
Social health	.567	
Quality of education	.539	
Family life	.721	
Social life		.839
Personal life		.837
Life satisfaction	.699	
Psychological life	.733	

The above table indicates the matrix of factors after rotation, which also includes two factors. The first factor contains five elements and the second one consists of two factors. From the obtained results, we conclude the following: the first factor explains 36.898% and includes the next five variables: Public Health, Education quality, Family life, Life satisfaction, Psychological health, as far as the second factor is concerned, it explains 53.484% and includes two variables: Quality of social life and Personal happiness.

Table 11

The variance matrix in the components coefficients

	Component matrix	
	Component	
	1	2
Social health	.496	-.275
Quality of education	.595	-.063
Family life	.602	-.398
Social life	.542	.651
Personal happiness	.553	.642
Life satisfaction	.676	-.235
Psychological health	.750	-.181

Table 11 indicates the magnitude and strength of the relationship between the factors before and after the rotation and analyses the projection of variables at the global levels.

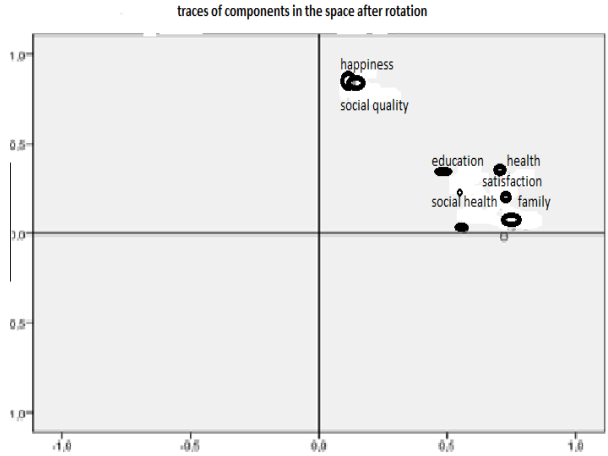


Figure 2. Traces of components after rotation

It is obviously shown from the diagram that the matrix of factors consists of two factors. The first one includes the component of quality of social life and personal happiness which are very identical and have a highly positive direction, close to the correct one, and have a highly quality of representation at this global level. Thus, we can measure the quality of a university student's life through these two dimensions only. As for the second factor is concerned, it contains the following five elements (public health, quality of education, quality of family life, life satisfaction, and mental health), which are close to each other, but they are far from the correct ones. It is in the positive direction as well, except for the family quality of life factor which changed the direction of negative values, and thus affected the amount and the results of other factors.

Table 12

Variance matrix in the component coefficients

Covariance matrix of component coefficients		
Component	*1*	*2*
1	1.000	.000
2	.000	1.000

The previous table results reveal that the presence of the quantity and strength of the relationship between the factors of good quality of life.

The feedback on quality of life indicate that the quality of general and psychological health are main indicators of quality of life and through which students become satisfied with their lives and have a high quality of life. It agrees with the study of al-Dulaimi et al. (2012) and Kazem and al-Bahadli (2006), which showed that there is a strong relationship between public health and quality of life, and agrees with the results of Abdel Mawgoed Eid Bayoumi (2014), which is the existence of a relationship between environmental participation, quality of life, environmental awareness, cultural heritage, quality of life and individual feeling, responsibility towards the family and the society in which he highly believes that it increases the quality of his life. Moreover, there is an interrelation between social skills and working with the group with life satisfaction, and this is conform to the study of Al-Hindawi (2011).

The indicators of quality of life are objective, subjective, and existential and are represented in the (quality of public health, quality of academic life, quality of family life, quality of social life, personal happiness, life satisfaction, quality of psychological life "mental health").

4 Limitations of the study

The questions of the tool and the research in general were applied on a sample of 963 male and female students with a percentage of 23.98% at the national level who were randomly selected from different disciplines of master's degree at the Faculty of psychology. Research was done during the academic year 2018/2019.

Conclusion and recommendations

Through the factor analysis, it becomes clear that there are seven main factors.

The results confirmed that the seven factors gathered around two main themes and axes that measure two elements of quality of life; the first component is related to each of the following: public health, quality of education, family life, life satisfaction, and mental health. The second one includes the quality of social life and personal happiness.

The factor structure of the chosen university student's quality of life measure through exploratory factor analysis has a good validity and stability, and it is distributed on two basic scales.

We highly recommend the use of this tool to measure the quality of life of a university psychology students.

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