



# A Psychometric Analysis of an Inventory for Evaluating Students' Leadership Skills

Abdulghani Ali Al-Hattami<sup>1</sup> and Omar Mohammed Muammar<sup>2</sup>

<sup>1</sup> Bahrain Teachers College, University of Bahrain, Manama, Bahrain

<sup>2</sup> Deanship of Education Development, University of Dammam, Dammam, Saudi Arabia

Received 28 Jan. 2016, Revised 01 Apr. 2016, Accepted 07 Apr. 2016, Published 01 July 2016

**Abstract:** This study reports on the exploration of psychometric properties of an Arabic version of leadership competencies' inventory adapted from Schumacher (1990) study. The inventory includes 35 items with four subscales that measure the following competencies: leading self and others, effective communication, problem solving, and planning skills. Participants were 436 (279 males and 157 females) students from a higher education institution in Saudi Arabia. Exploratory and confirmatory factor analyses and Cronbach's alpha coefficients were used to provide evidence on the psychometric property of the scale and each subscale. The results showed that the four model factor analysis explained 42% of the total variance. Reliability analyses indicated that the overall Cronbach's alpha coefficient was 0.94 and alpha for subscales ranged from 0.74 to 0.86. Implications and limitations were highlighted.

**Keywords:** Psychometric Properties, Leadership Competencies, Exploratory and Confirmatory Factor Analyses.

## 1. INTRODUCTION

Leadership talent is getting much attention in today's higher education systems. Higher education institutions aim at producing highly qualified graduates who are capable of making real changes in workplaces and contribute to the development of economy. The needs have been expressed highly by local, national and international levels (Casner-Lotto et al., 2006; Banerji, 2007; Paige 2009, Trilling and Fadel, 2009; Bellanca and Brandt, 2010; Dixon et al., 2010; Yoon et al., 2010). Furthermore, people exercise leadership at different levels and places of their lives: home, school, work, and community. Leadership skills ought to be essential competences for individuals in business and global market today. Reports from business sectors highlighted the great need for leadership skills and consider them essential skills for success in work environment in addition to core subject knowledge (Banerji, 2007; Trilling, 2009; Bellanca and Brandt, 2010; AlMunajjed, 2012). Schools, however, pay less attention to these skills and have poor intention to develop these potentials.

National and international reports on education systems in the new millennium showed a genuine gap between markets needs and schools outcomes. Therefore, a paradigm shift in education systems has been emerged

to face the challenges of the 21st century. Program for International Students Assessment (PISA) reports on schools outcomes in the United States, for instance, indicated that the goal of education systems today is to help students to learn skills in problem solving, creative thinking, team working, and leading self and others effectively and not only focus on core subject matter (OECD, 2011). In Saudi Arabia, the Ministry of Planning and Economy pointed to this gap in the Ninth National Plan and explicitly expressed that graduates from higher education institutions lack leadership skills, like ability to plan, ability to solve problems and make decision, and skills for communication and managing conflicts (Paige, 2009; Trilling et al., 2009; Bellanca and Brandt, 2010; Planning, 2010). The National Framework of Graduate Competencies in Saudi Arabia specifically reported that students graduating from higher education institutions should be equipped with general soft skills (such as creative thinking, problem solving skills, communication skills) in addition to core subject knowledge (Planning, 2010).

### 1.1 Definition of leadership

Scholars have studied the leadership potential through different schools of thoughts. Trait theorists contend that leaders possess certain qualities in leadership situations (McNichol, 2001; Yoon et al., 2010; Northouse, 2012).



Other theorists (e.g., Barnard, 1938; Lewin et al, 1939) defined leadership as an ability to lead and that leaders have natural ability to lead. Another team of scholars (e.g., Burns, 1978; Heifetz, 1994; Ciulla, 1998) believe that leadership is a skill which can be developed and nurtured to accomplish tasks effectively. Behaviorists (McGregor's, 1960; Skinner, 1974) explained that leadership is an observable behavior in various situations. Contemporary theorists (David McClelland, 1998) think relationship is central to leadership potential since communication occurs between a leader and followers. Recently, leadership is perceived as an influence process whereby a leader influences a group of people to achieve a common goal (Northouse, 2012). The diversity of schools of thoughts about the concept of leadership derived many assessment tools of leadership potential.

The meaning of leadership has multidimensional facets. For some scholars (Stogdill, 1974; Mann, 1959) leadership is a trait or ability more than a skill. This classical school of thought has dominated the field of leadership for a long period of time. The underlying principle is that leadership potential is manifested by hereditary. For other scholars (Chomsky, 1999; Montana and Charnov, 2000), leadership constitutes skills or competencies that can be developed and learned. This school of thought has got much attention in recent years. The creed of proponents of this school is that because leadership is a skill or a behavior, then it can be learned (Yoon et al., 2010; Northouse, 2012). The authors assert that the leadership concept encompasses several psychological dimensions and cannot be explained by only one cognitive factor. Thus, this paper researches the core competencies of leadership potential as perceived by university students.

### 1.2 Leadership Competencies

Several frameworks have conceptualized leadership potential but this study used the framework of Northouse (2012). Northouse conceptualized that leadership skills fall into three major categories: administrative skills, interpersonal skills, and conceptual skills. The administrative skills refer to those competencies that leaders possess to run an organization. These skills include planning, organizing work, managing resources, and technical skills. The interpersonal skills include possessing effective communication skills, showing emotional intelligence, and ability to handle conflicts. The conceptual skills include problem solving ability and strategic planning. The authors of this article used this framework to conceptualize the assessments of leadership skills which fall into the three major categories. This study focused on four skills: (1) leading self and others which falls in the administrative skills category, (2) effective communication which falls into interpersonal category, and (3) planning and (4) problem solving which are related to the conceptual category. These four skills are considered among the essential skills and

competencies for any leader (Yoon et al., 2010; Northouse, 2012). Drawing on the previous frameworks, the authors believe that these are essential leadership skills for students to learn and it is very important to develop a valid scale that measures these skills whereby instructors could use in a classroom setting to observe the desired behaviors under each construct in order to improve the leadership potential.

With the increased interest in developing leadership potential, there is a real need for valid and reliable scales to assess these competencies and other leadership behaviors in a more objective manner. This need is authentic in Saudi Arabia. Several generic leadership scales exist, yet a detailed Arabic version that includes the primary leadership competencies and skills is more important for several purposes. For instance, such scale could be used as a needs assessment for training purposes and for identifying leadership potential. Faculty in academic programs can use this scale to determine the needs of students' skills in the classroom settings and thus provide a proper training and feedback for students. The scale also can be used by any individual to get a constructive and specific feedback about his/her strengths and weaknesses on leadership competencies. Furthermore, it can help instructors quantify students' leadership potential for developmental purposes as well as to compare between students' competencies in leadership potential.

The current study adapted the Schumacher (1990) questionnaire on leadership which consisted of several subscales including: motivating others, decision making, supervisory skills, management of self, adaptability, innovation, understanding others, and communications skill. This scale has been validated in a study carried out by Gordon (1995). In his study, Gordon explored how students in the college of education at Marshall University perceived their leadership skills. In a random sample consisted of 117, students perceived that their management of self and understanding of others skills were high and their communications, motivating others, inspirational ability, and decision making were low. Abo Jadow (2013) found similar results on a sample consisted of 305 students at the University of Dammam. Students perceived their ability of decision making, problem solving, and planning to be low and their ability of self-management and understanding others to be high. For the communication skills, Abo Jadow's results contradicted the results of Gordon's study. The communication skills were perceived as the highest among students at the University of Dammam. Yoon et al. (2010) carried out a study on psychometric validation of Leadership Competency Inventory (LCI). The sample consisted of 323 managers in health industry. The authors argued that using exploratory factor analysis, item-total correlations, Cronbach's alpha coefficients and confirmatory factor analysis revealed an evidence of validity and reliability of LCI. The existence of a valid and reliable Arabic



assessment tool of leadership skills for specific population is very important to be able to provide an accurate and precise feedback about particular competences.

### 1.3 Purpose of the Study

The aim of this study is to validate the use of an Arabic version of leadership competencies' inventory adapted from Schumacher (1990) study to evaluate the students' leadership skills in schools and colleges. The authors reviewed the literature on core leadership competencies and ought to examine the validity and reliability of an Arabic version of Schumacher (1990) leadership scale. The leadership scale includes the following dimensions: (a) leading self and others, (b) problem solving skills, (c) communication skills, and (d) planning skills. The authors explored and examined the psychometric properties of the leadership scale on a sample from a higher education population.

## 2 METHODS

### 2.1 Subjects

The sample included in this study was 436 participants from the different colleges of the University of Dammam. Participants were asked to complete a leadership questionnaire as part of their registration for a leadership program that was conducted two times by the Deanship of Education Development at the University of Dammam. The first time 268 participated in the 2011 event and 168 participated in the 2013. The program aimed at improving leadership skills.

### 2.2 Measurement

A questionnaire for leadership skills adapted from Schumacher (1990) study and based on the theory of Northouse (2012) was employed. The leadership scale consisted of 35 items and a response format of a 4-point scale. The leadership scale consisted of four subscales; self and others management, communication, planning, and problem solving. Participants were asked to rate each item on a scale of 1 (very minimally applied to me) to 4 (very highly applied to me). The questionnaire was translated from English into Arabic by a native speaker of Arabic who is very advanced in English and translated back to English by an independent person. This showed that the meaning of the items of the questionnaire resembles that of the original English version. The content validity was checked by three experts in the related field.

### 2.3 Procedures

The psychometric properties (exploratory and confirmatory factor analyses, validity and reliability) of the questionnaire were examined in this study. Barlette's test of sphericity and the Kaiser–Meyer–Olkin (KMO) measure of sample adequacy were used to determine whether the items were suitable for factor analysis. A model fit in confirmatory factor analysis was also checked by  $\chi^2$  statistics which should not be significant.

Exploratory Factor Analysis (EFA) was performed using SPSS 19.0 software. The principal component analysis with Varimax rotation method was implemented to investigate the factorial loadings of the items. Factors with an Eigen value > 1.0 were deemed appropriate. Furthermore, the Scree Plot method (Cole, 1987) was also used to extract the acceptable number of factors. To further examine the factorial structure, Confirmatory factor analysis using LISREL 8.8 (Jöreskog & Sörbom, 1996) was employed to assess how well the data fit the model. Cronbach's alpha coefficients were calculated to determine the internal reliability of the items.

## 3 RESULTS

The goodness-of-fit of the 4-factor model presented by the authors based on the theory of Northouse (2012) and the adaptation of the Schumacher (1990) scale was explored and then confirmed by the confirmatory factor analysis. Results indicated that the 4-factor solution had a good fit to the data. Barlette's test of sphericity indicated a chi-squared value of 4304.99,  $df = 595$  ( $p < 0.000$ ) and the Kaiser–Meyer–Olkin (KMO) value of .938 suggesting that the items were suitable for performing factor analysis. A four model factor analysis fitted the data well and explained 42% of the total variance. Exploratory factor analysis was conducted first to examine the factor loadings of the questionnaire items. The Scree Plot with an Eigenvalue > 1.0 was also checked. Table 1 presents the factor loading of the leadership talent questionnaire items.



TABLE I. FACTOR LOADINGS OBTAINED FROM THE EXPLORATORY FACTOR ANALYSIS (N=268; ITEMS=35)

Scales	Items	Factor loadings			
		1	2	3	4
<b>Planning</b>	1. I put a deadline to do things and abide by them أضع مواعيد نهائية لعمل الأشياء والتزم بها	.662			
	2. I achieve my goals as the end of the year approaches أقرب مع نهاية كل عام من تحقيق أهداف وضعتها	.645			
	3. I often do not use a schedule to help me achieve my goals غالباً لا أستخدم جدولاً زمنياً لتحقيق أهدافي	.641			
	4. I have high values that direct my actions and behaviors لدي نظام قيمي واضح يوجه أفعالي وتصرفاتي	.593			
	5. I state my opinion and make choices easily أضع وأحدد وجهة نظري وخياراتي بسهولة	.538			
	6. I have a clear vision to what makes my future better لدي رؤية واضحة لما سيجعل العمل أفضل مستقبلاً	.505			
	7. I am reliable and responsible أتصف بالثبات والتحمل والمسؤولية	.451			
	8. I choose the right time to suggest new ideas or projects أستطيع معرفة الوقت المناسب لطرح فكرة أو مشروع جديد	.444			
	9. I insist on high standards in group activities أصر على المعايير العالية في نشاطات المجموعة	.391			
	10. I responsible for putting strategic plans أنا المسؤول عادة عن وضع خطط إستراتيجية للعمل	.346			
<b>Communication</b>	1. I believe in others and I respect them أثق بالآخرين وأحترمهم، وأحترم حقوقهم وأراهم وأبقي على الثقة داخل المجموعة		.769		
	2. I take care of others and treat them أهتم بالآخرين وأعاملهم بعدالة وأحاول تفهم مشاعرهم وحاجاتهم		.717		
	3. I support the decisions the group make even if I am not convinced with them أدعم قرارات المجموعة حتى لو لم أكن موافقاً عليها		.643		
	4. I communicate well with others أتصل بشكل جيد مع الأشخاص في السلطة وكذلك مع التابعين		.640		
	5. I work effectively to come with an agreement with others أعمل بفعالية لمواعاة المهمات مع الأشخاص		.602		
	6. I have an open-minded when the group has a discussion أشارك بعقلية منفتحة في نقاشات المجموعة		.589		
	7. I solve the problems that the group may have أحل الصراعات داخل المجموعة ويمكن أن أكون سفير سلام عند الضرورة		.430		
	8. I easily make friends أكون صداقات بسهولة		.344		
<b>Problem solving</b>	1. I have innovative imagination and unprecedented ideas لدي خيالاً إبداعياً وأفكاراً غير عادية			.825	
	2. I give many great ideas أنتج العديد من الأفكار (الطلاقة)			.689	
	3. I can motivate others أستطيع استثارة دافعية الآخرين			.632	
	4. I ask questions and I am curious to learn more أطرح الأسئلة ولدي حب استطلاع			.556	
	5. I can communicate effectively, orally and in written form أعبر عن نفسي بشكل جيد، كتابةً وشفوياً			.557	
	6. I have a clear vision and I can convince others with it لدي رؤية أوصلها للآخرين			.552	
	7. I can convince others to appreciate my opinions أستطيع إقناع الآخرين باحترام وجهة نظري			.458	
	8. I can predict results based on given situations أنتبأ بالنتائج من أفعال معينة			.389	
	9. I know myself and I believe in me أدرك ذاتي وأثق بها			.343	
<b>Self and others management</b>	1. I can make conclusions and generalizations يمكنني الوصول إلى الاستنتاجات والتعميمات				.788
	2. I know the requirements and I can find many ways to solve problem أدرك الاحتياجات وأجد طرقاً مختلفة لحل المشكلات				.755
	3. I analyze the facts and find solutions before making decisions أحل الحقائق وأقيم الحلول قبل اتخاذ القرارات				.725



4. I can define problems clearly أستطيع تحديد المشكلات بوضوح					.622
5. I have right tools to evaluate the achievements of goals لدي أساليب ومحتكات ملائمة لتقييم مدى تحقق الأهداف					.485
6. I can understand others easily لدي قدرة على فهم الآخرين بسهولة					.461
7. I realize my strengths and weaknesses لدي معرفة واضحة حول نقاط قوتي وضعفي					.406
8. I understand that others have feelings, needs, and goals أتفهم وجود مشاعر وحاجات وأهداف للآخرين					.316

A confirmatory factor analysis was used to confirm the factorial validity of the questionnaire. The Goodness-of-fit of the model was identified for the four factor model of the leadership competencies scale, leading self and others, effective communication, problem solving, and planning skills.

The Chi-square for each scale was small and not significant ( $P > 0.05$ ); the RMSEA values were  $< 0.05$ ; the NNFI, the DFI, and the AGFI values were all close to 1.00 indicating the good fit to the model for each of the four subscales.

TABLE II. GOODNESS-OF-FIT SUMMARY

Leadership Talent	$\chi^2$	<i>df</i>	<i>P</i>	RMSEA	NNFI	CFI	AGFI
Leading self and others	12.82	7	0.07	0.01	0.95	0.99	0.97
Effective communication	9.35	1	0.09	0.03	0.93	0.98	0.99
Planning	1.41	3	0.30	0.00	0.97	0.98	0.90
Problem solving	7.94	1	0.21	0.04	0.97	0.94	0.93

TABLE III. INTERNAL RELIABILITY OF THE LEADERSHIP TALENT'S QUESTIONNAIRE

Leadership Talent	No. Items	Cronbach's alpha
Leading self and others	8	.77
Effective communication	8	.80
Planning	10	.86
Problem solving	9	.84
Total	35	.94

The reliability coefficient for the 4-factor model was estimated by Cronbach's alpha (Table 3). The  $\alpha$  for the total score was .94, indicating very high internal consistency. Cronbach's  $\alpha$  for self and others management was 0.77, for communication was .80, for planning was 0.86, and for problem solving was .84.

#### 4 DISCUSSION

Leadership skills are the secret ingredient for success in work place, life, and global community. We cannot imagine seeing a successful person who lacks leadership capabilities. The Saudi government believes that its graduates need to be equipped with generic skills in

addition to the subject matter of their specialization. Teaching leadership skills seem to be neglected in higher education curriculum. An obvious reason for this negligence could be due to inexperienced teachers who may not have the skills to teach and/or evaluate leadership potentials. Therefore, the researchers in this study attempted to adapt and psychometrically validate an instrument based on Schumacher leadership scale (1990) and the framework of Northouse (2012). The results of the current research are in line with findings of many other studies (Kelloway, Catano, & Southwell, 1992; Cordery & Sevastos, 1993; March, 1996; Roberts, Lewinsohn & Seeley, 1993).



The results of this study support the use of the Arabic version of the leadership scale that consists of four subscales; leading self and other, problem solving, effective communication and planning. The four subscales together measure the construct of leadership. Therefore, the use of this scale will give a satisfactory indication to whether students carry leadership competencies or not. Then instructors can decide if more interventions are needed for particular group of students. The improvement of soft skills including leadership skills is not a matter of choice today, it's a compulsory task that goes under all faculty members' responsibilities. Faculty should pay serious attention to these skills and try to integrate them in all academic programs to respond to the 21st century challenges (e.g.; critical thinking, problem solving, information literacy and global awareness) in workplace and global community effectively.

## 5. IMPLICATION OF THE STUDY

The study has many implications in higher education. First, it will help instructors to systematically assess the leadership competencies. Second, it may give feedback to students about areas of excellence and areas that need improvement. Third, the result might be used collectively as needs assessment of skills that need to be improved. Fourth, it may serve as a reliable tool that faculty can use to develop the leadership competencies for all students regardless their academic affiliations. In order to achieve the above goals, the need for a valid and reliable tool in assessing the leadership skills cannot be neglected.

The current study may ignite several research proposals agenda. The authors are planning to examine this scale further with a larger sample size. They will also seek to develop a rubric for all soft skills to help faculty use a systematic and equal assessment tools to assess students' soft skills as articulated in the National Framework in Saudi Arabia. Furthermore, the tools will be calibrated throughout the entire academic programs to ensure gradual development of these skills in a more precise fashion. The authors also suggest that a professional development training programs should be carried out to help faculty integrate these soft skills in the curriculum. The ultimate goal of such project is to ensure the availability of Arabic and English versions of generic soft skills assessment tools that are valid and reliable to ensure progressive development of such skills throughout the academic programs.

## 6. LIMITATIONS OF THE STUDY

Several limitations are associated with the current study. First, the scale was based on participants' perception, not their actual leadership behavior. Accordingly, student might tend to provide a socially accepted response to certain behaviors which might influence the validity of the scale. Second, the sample was not selected randomly, instead voluntarily. Thus, the sample might be biased and not necessarily representing

the population. Finally, the leadership scale is comprised of selected leadership competencies and excluded many. Yet, the authors think that these skills are core in leadership.

## REFERENCES

- Abo Jadow, M. (2013). *Gender Differences in Leadership skills*. Dammam, University of Dammam Press.
- AlMunajjed, M. (September, 2012). Bridging the skills gap... a priority to boost job market. *Arab News*.
- Banerji, S. (2007). Employers say college graduates lack essential skills to succeed in today's global economy. *Diverse Issues in Higher Education*, 23(26), 18-18.
- Barnard, C.I. (1938). *The Functions of the Executive*. Cambridge, MA: Harvard University Press.
- Bellanca, J. A., & Brandt, R. S. (2010). *21st century skills: Rethinking how students learn*. Bloomington, IN, Solution Tree Press.
- Burns, J.M. (1978). *Leadership*. New York. Harper & Row.
- Casner-Lotto, J., Conference Board., Partnership for 21st Century Skills., Corporate Voices for Working Families., & Society for Human Resource Management (U.S.). (2006). *Are they really ready to work?: Employers' perspectives on the basic knowledge and applied skills of new entrants to the 21st century U.S. workforce*. [United States]: Conference Board.
- Chomsky, N. (1999). *Profit Over People: Neoliberalism and Global Order*. Seven Stories Press: New York.
- Ciulla, J. B. (1998). *Ethics, the heart of leadership*. Westport, CT: Greenwood.
- Cole, D. A. (1987). The utility of confirmatory factor analysis in test validation research. *Journal of Consulting and Clinical Psychology*, 4, 584-594.
- Cordery, J. L., & Sevastos, P. P. (1993). Responses to the original and revised job diagnostic survey: Is education a factor in responses to negatively worded items? *Journal of Applied Psychology*, 78(1), 141-143.
- Dixon J., Belnap, C., Albrecht, C., & Lee, K. (2010). The importance of soft skills. *Corporate finance review*, 14(6), 35-38.
- Heifetz, R. A. (1994). *Leadership without easy answers*. Cambridge, MA: Harvard University Press.
- Howard R. D. (1995). An assessment of the Leadership Skills of College of Education Students at Marshall University. *Annual Conference of the Eastern Educational Research Association*. Hilton Head, SC.
- Kelloway, E. K., Catano, V. M., & Southwell, R. R. (1992). The construct validity of union commitment: Development and dimensionality of a shorter scale. *Journal of Occupational and Organizational Psychology*, 65, 197-211.
- Lewin, K., Lippitt, R., White, R.K. (1939). Patterns of aggressive behavior in experimentally created social climates. *Journal of Social Psychology*, 10, 271-301.
- Mann, R. D. (1959). A review of the relationship between personality and performance in small groups, *Psychological Bulletin*, 66(4): 241-70.
- Marsh, H. W. (1996). Positive and negative global self-esteem: A substantively meaningful distinction or artifacts? *Journal of Personality and Social Psychology*, 70(4), 810-819.



- McClelland, D. C. (1998). Identifying competencies with behavioral-event interviews. *Psychological Science*, 9(5), 331-339.
- McGregor, D. (1960). *The human side of enterprise*. New York: McGraw-Hill.
- McNichol, E. (2001). Measure your leadership skills. *Nursing Standard* 15(22), 77-77.
- Northouse, P. G. (2012). *Introduction to leadership: concepts and practice*. Thousand Oaks, Calif.: SAGE Publications.
- Nunnally, J. C. (1967). *Psychometric theory* (1<sup>st</sup> ed.). New York: McGraw-Hill.
- OECD (2011). *Lessons from PISA for the United States, Strong Performers and Successful Reformers in Education*, OECD Publishing.
- Paige, J. (2009). The 21st Century Skills Movements. *Educational Leadership*, 67(1), 11-11.
- Patrick J. Montana and Bruce H. Charnov (2000). Training and Development. *Management*. Barron's Educational Series. pp. 225.
- Planning, MoE. (2010). *The ninth development plan*. Riyadh: Saudi Arabia.
- Roberts, R. E., Lewinsohn, P. M., & Seeley, J. R. (1993). A brief measure of loneliness suitable for use with adolescents. *Psychological Reports*, 72, 1379-1391.
- Schumacher, L. G. (1990). Perceived leadership ability of students enrolled in college agriculture. ND: Fargo, North Dakota State University.
- Skinner, B. F. (1971). *Beyond freedom and dignity*. New York: Knopf.
- Skinner, B. F. (1974). *About behaviorism*, New York: Knopf.
- Stogdill, R.M. (1974). *Handbook of Leadership: A Survey of Theory and Research*. New York: Free Press.
- Trilling, B., and Fadel, C. (2009). *21st century skills: learning for life in our times*. San Francisco, Calif., Jossey-Bass ; Chichester: John Wiley.
- Yoon, H. J., Song, J. H., Donahue, W. E. and Woodley, K. K. (2010). Leadership competency inventory: A systematic process of developing and validating a leadership competency scale. *Journal of Leadership Studies*, 4(3), 39-51.

