

Formation of the Leadership Position of Professionals in Higher Education Institutions

Liudmyla SHELESTOVA¹,
Iryna KOSTYRIA²,
Valentina FEDYAEVA³,
Svitlana BRYCHOK⁴,
Maryna BOHOMOLOVA⁵,
Iryna TOMASHEVS'KA⁶

¹ Leading Researcher, Department of Didactics, Institute of Pedagogy, National Academy of Pedagogical Sciences of Ukraine, Kyiv, Ukraine, researcher74@meta.ua

² Candidate of Pedagogical Sciences, Assistant Professor, Ivan Ziazun Department of Pedagogy and Psychology, Management of Social Systems, National Technical University "Kharkiv Polytechnic Institute", Kharkiv, Ukraine, superirina2016@ukr.net

³ Doctor of pedagogical sciences, professor, Kherson State University, Ukraine, valentina.fediaieva@gmail.com

⁴ Candidate of pedagogical sciences, Associate Professor of the Department of Pedagogy of Primary Education, Rivne State Humanities University, Rivne, Ukraine, brychok.zd@gmail.com

⁵ Candidate of pedagogical sciences, Associate Professor of Department of Fundamental Disciplines, Kherson Institute "Interregional Academy of Personnel Management", Kherson, Ukraine, bogomolova-77777@ukr.net

⁶ Candidate of pedagogical sciences, Professor of department of general pedagogy and preschool education, Lesya Ukrainka Lutsk Eastern European National University, Lutsk, Ukraine, tomira25@gmail.com

Abstract: The article theoretically substantiates, develops and experimentally verifies pedagogical conditions for forming the leadership position of future engineers in higher education institutions of technical profile. The concept of the leadership position of a future engineer was first defined as a conscious willingness to fulfill the role of a leader and the totality of all relations of his personality to the reality formed in a certain system of group relationships generated by this awareness. The basic components of a leadership position are defined: motivational-value, cognitive, activity and personal. It is experimentally proved that pedagogical conditions of formation of the leadership position of the future engineer in the institution of higher technical education are: involvement of students in practical independent activity, which involves the application of organizational, communicative, cognitive, reflexive skills and causes the manifestation of their leadership; modeling of professionally oriented tasks, which require students to choose the best ways of leadership influence in situations of dialog and group interaction; nurturing a valuable attitude to leadership in out-of-class and classroom work.

The model of realization of pedagogical conditions of formation of the leadership position of future engineers in institutions of higher technical education has been developed, which includes the purpose, methodological approaches, methodological support of the realization of pedagogical conditions, estimation of levels of formation of leadership position in future engineers. The special importance of the complex and consistent introduction of pedagogical conditions in work with future engineers is shown.

Keywords: *leadership position; future engineers; educational process; higher technical educational institution; pedagogical conditions.*

How to cite: Rebukha, L., Polishchuk, V., Chumak, L., Zahoruiko, Y., & Prokopchuk, I. (2020). Formation of the Leadership Position of Professionals in Higher Education Institutions. *Postmodern Openings*, 11(2Sup1), 145-160. <https://doi.org/10.18662/po/11.2Sup1/184>

1. Introduction

In modern conditions of development of society, which is caused by the transition from the industrial social formation to the formation of a new type – informational one, dynamic development of science and technology is important, which significantly increases the role of engineering activity in society. As noted by French (2016), “leadership theories have shifted from person-centered to collective in the postmodern era”, as shown in the article (Kniffin & Patterson, 2019).

At the same time, those countries where the most attention is paid to the problem of selection and professional training of the most capable and talented youth are reaching more efficient development of the industry. New challenges for future engineers are related to the pressing phenomena of today. One of these challenges is related to their willingness to perform design, production, technological, research and organizational-managerial functions. The fulfillment of organizational and managerial function is impossible without the established leadership position, therefore the formation of leadership positions in future engineers is one of the important problems of technical education, which causes the formation of engineers of new formation, who are not only able to exploit and use new technologies but also capable of initiating and managing in the technological process.

The training of highly qualified competitive specialists in the aspect of the modern higher education system determines the future engineer's willingness not only to mastering professional knowledge but also to personal development, unlocking of potential, the formation of organizational abilities. Such requirements for the personality of the future engineer make it necessary to direct them to the management functions, organizational influence on the production team, fulfillment of the role of leader, which is ensured by the formation of leadership position. The article is devoted to the formation of modern theories of leadership, the provisions of which can be used in solving the tasks of training leaders in higher education.

2. Analysis of recent research and publications

The study of the phenomenon of leadership, the development of concepts and mechanisms for the development of leadership qualities of the individual, in particular, referred to in the works of Holmberg (2016). Jensen et al. (2018) consider a new approach to leadership theory, the so-called Self-Action-Leadership, which aims to go beyond postmodern thinking. In the article by Tabrizi and Rideout (2016) postmodern and

modernist approaches to leadership training are compared, using the example of schools in Canada (postmodern) and Iran (modern). A considerable number of theoretical and methodological propositions that may be useful for solving the tasks of training professional leaders are presented in the writings of famous psychologists and educators, who developed the issues of the position of personality revealed. The development of the country's economy depends largely on the level of competence, training, personal qualities and moral condition of leaders at all levels (Sandu & Unguru, 2018). The article by Shportun et al. (2019) is devoted to the problem of leadership in a youth social group. The process of forming the leadership position of future engineers in higher technical education institutions will be facilitated by the considerable experience of modern education and personality development that has been accumulated in national and world pedagogy. In the article by Rottmann et al. (2015) the compound model of engineering leadership is presented. The article by Yezhova et al. (2018) describes the world's best practices in training leading engineers and designers in the fashion industry. The article by Miller and Miller (2020) is devoted to the leadership in the grocery retail industry.

The study by Handley and Berdanier (2019) identifies four qualities necessary for an early-career engineer to lead: “technical forthrightness, positivity through sociotechnical constraints, builds interdisciplinary alliances, adaptive communication”. The study of Paoletti et al. (2020) proposed a checklist for diagnosing the engineer’s leadership skills and teamwork opportunities in the following categories: communication, cognition, coordination, coaching, cooperation, and conflict.

The article by Bilimoria and Singer (2019) dedicated to the ADVANCE project of the National Science Foundation “Institutions Developing Excellence in Academic Leadership” (IDEAL) in STEM education. The paper by Alba-Flores and Rios (2019) describes educational experience in building leadership skills and teamwork by adding peer-reviewed activities to the Capstone Design Electrical Engineering courses. The article by Corriveau (2020) describes an original course for masters, which includes an intensive leadership camp at a Canadian university.

The article by Akdere et al. (2019) defines the competencies necessary for leadership success in the field of STEM.

This research by Balderas et al. (2019) aims to address a computer supported assessment of the student’s generic skills such as teamwork, leadership, and problem solving.

The results of the study Ghazalan et al. (2019) showed that employers' perception of the level of leadership skills of engineering students in Malaysia is at a moderately low level.

Despite the considerable number of scientific researches which to some extent contribute to the solution of the mentioned problem, it can be stated that the problem of forming the leadership position of future engineers is not sufficiently investigated in modern pedagogical science.

3. Research methods

The purpose of the research is theoretical substantiation, development and experimental verification of pedagogical conditions of formation of the leadership position of future engineers in higher education institutions of a technical sphere.

3.1. The theoretical basis for the formation of leadership qualities of future engineers

The hypothesis of the study is based on the assumption that the effectiveness of forming a leadership position of future engineers in higher technical education will increase if the educational process to implement the following interrelated pedagogical conditions:

1) involvement of students in practical independent activity, which involves the use of organizational, communicative, cognitive, reflexive skills and determines the manifestation of their leadership position;

2) modeling of career-oriented tasks, which require future engineers to choose the best ways of leadership influence in situations of dialog and group interaction;

3) nurturing the value attitude of future engineers to a leadership position during out-of-class and audit work.

Leadership is a process of influence on people, generated by the system of informal relations, while management first implies the presence of clearly structured formal relationships through which it is realized. The role of the leader as determined by the formal structure, as a rule, is indisputable (e.g. the right to apply sanctions). Leadership, on the contrary, is formed spontaneously at the level of semi-conscious psychological preferences (Main et al., 2019).

The main criteria that characterize the level of leadership of students of higher technical education institutions are: motivational-value, cognitive-behavioral, personality-reflexive.

The motivational-value criterion of forming a leadership position in students included: the conscious attitude of students to the formation of

their leadership position, awareness and manifestation by future specialists of group interests in the professional sphere, awareness, and understanding of students' professional responsibility of the engineer, ability to determine the situation of the engineer teams, motivated focus on success. The cognitive and behavioral criterion of forming a leadership position in students characterizes the level and quality of students' knowledge, their methods of analysis, synthesis, comparison, their intellectual skills, as well as practical skills that represent a set of externally observed actions and actions aimed at a successful professional activity. The personality-reflexive criterion of formation of leadership position in students is characterized by the level of development of business qualities and individual-psychological characteristics of the personality of future specialists necessary for successful professional activity of an engineer.

A leadership position is a personal formation that, among other things, is based on a value-based attitude towards leadership and leadership position. Awareness of the importance of leadership to achieve the professional and personal success of a future engineer is one of the key conditions for its formation. In such circumstances, it is obvious that only the means of education can provide a proper influence on the personality of the future engineer (Antonio Florez, 2019).

In developing a valuable attitude to leadership in extra-curricular and auditory work, the following areas are most important (Floris et al., 2020):

- awareness of the future engineer of the importance of leadership position for harmonious social interaction in the process of realization of professional tasks;
- development of value attitude towards group interests in the professional sphere;
- understanding of the future engineer opportunities, which opens a leadership position in the development of his career and professional success;
- the emergence of a future engineer with a focus on success, a positive attitude and motivation to form a leadership position;
- awareness of moral content and moral conflicts in the activity of an engineer with a leading position.

In the structure of leadership position were distinguished four components: motivational-value, cognitive, activity and personal. The motivational value component reflects the future engineer's focus on leadership and success in a professional career. This component manifests itself in the value of the profession and its self-development in it. The cognitive component of a leadership position reflects an understanding of the importance

of leadership for personal and professional success. The activity component reflects the ability of the individual to put their knowledge and skills into practice; as well as a willingness to transform practical experiences from different spheres of life to achieve professional goals. The personal component reflects the qualities of the person, which are necessary for the development of a leadership position.

Forming a leadership position is a response to the social order of society, as the pace of technology development requires engineers to innovate leadership thinking, leadership behavior, leadership engagement with followers.

3.2. Methods of pedagogical experiment

The leadership position of future engineers is defined as a personal formation, which includes the awareness of the future engineer of readiness to fulfill the role of leader and ability to organizational influence on the production team; it is based on the leadership potential of the individual and is formed in the process of assimilation of the leadership role in different life situations, including the conditions of professional engineering sphere.

In the process of realization of the first pedagogical condition, students were involved in practical, independent activity, which involves the application of organizational, communicative, cognitive, reflexive skills and determines the manifestation of their leadership position.

In the process of realization of the second pedagogical condition, two basic methods of active learning were used, which allowed simulating professionally-oriented situations that would contribute to the formation of the leadership position of future engineers: the method of role modeling of specific situations, the method of business conversations.

The instrument of realization of the third pedagogical condition used the methods of education that were introduced in the process of studying the disciplines of the psychological-pedagogical cycle. Students were offered lectures that revealed the complexity of the psychological and moral content of the engineer's activity on specific historical examples; they were invited to participate in discussions about the role and importance of the engineer in the modern world and Ukraine, in particular. Those were held as extra-curricular work, which created conditions for mastering the leadership position through the application of methods of pedagogical requirement, assignment, stimulation and adjustment of innovative activity, approval and encouragement. Based on the above criteria and indicators were distinguished three levels of leadership: high, medium, low. The high level (H) of leadership position indicates that the future engineer is aware of being a leader whose authority and power are unconditionally

recognized by the rest of the group in one or more areas of activity; who is capable of the skillful use of the latest technologies, fruitful relationships with team members and aimed at an active, productive life, knowledge of the world and self, self-development. The medium level (M) of the leadership position of the future engineer is characterized by the student's attitude towards himself as a leader, the awareness of the importance of the leadership position for the future engineer, and the positive-passive attitude towards its formation. Students of this level, situationally, under the influence of external influence can qualitatively perform the functions of a leader. Low level (L) of leadership position formation in future engineers is characterized by an indifferent or negative attitude to leadership position formation, lack of interest in manifestation of leadership phenomenon, lack of desire for self-expression, the predominance of motivation to avoid failures (Hanapi et al., 2018).

It was established that the first pedagogical condition for the formation of leadership position in future engineers was to identify the involvement of students in practical independent activity, which involves the use of organizational, communicative, cognitive, reflexive skills and determines the manifestation of their leadership position. The second pedagogical condition for forming the leadership position of future engineers was the modeling of vocationally-oriented tasks that require students to choose the best ways of leadership influence in situations of dialog and group interaction. The third pedagogical condition was the development of the value attitude to the leadership position in extra-curricular and auditory work, which was realized through the introduction into the educational process of students of the system of leadership development programs in special courses of teachers of the Department of Pedagogy and Psychology of the National Technical University "Kharkiv Polytechnic Institute".

The most favorable for deepening the understanding of the importance of leadership of the future engineers in the aspect of personal, professional and social development, the author considers such tools for the implementation of the third pedagogical condition, such as lectures of problematic presentation, conversations, example method, pedagogical requirements, public opinion, public opinion stimulation and adjustment, competition.

Statistical methods for quantitative and qualitative analysis of empirical data (methods of mathematical statistics) were used to check the effectiveness of the developed pedagogical conditions for forming the leadership position of future engineers in higher technical education institutions (pedagogical experiment). To determine the existing level of

leadership of students of higher technical education institutions, an experiment was conducted using (Mazzetto, 2019):

1) the author's questionnaire for the study and analysis of the leadership position of the future engineer, which was suggested to diagnose the formation of the leadership position of future engineers and was implemented in the practice of higher technical education institutions (in the number of 48 questions);

2) the Leadership Self-Assessment Questionnaire to assess the expression of leadership skills;

3) methods of diagnostics of leadership abilities, according to which the researchers were offered 50 statements to be answered "yes" or "no", the results were evaluated according to the key of the questionnaire: if the sum of points received was less than 25 - the qualities of leaders were rated as low, from 26 to 35 points as a medium, from 36 to 40 points as high, and more than 40 points as manifestations of a tendency to dictate (Fetiskin et al., 2002, pp. 233-237);

4) multifactor leadership questionnaire, with the help of an opportunity to explore leadership style (Ilyin, 2002);

5) a bipolar self-assessment questionnaire for leadership effectiveness for screening for mood disorders (bipolar screening);

6) E. Shostrom's self-actualization questionnaire (POI) for measuring the degree of self-actualization of a person whose specific questions were selected from a large set of critical, first and foremost behavioral and value indicators that distinguish a healthy self-actualizing person from a neurotic;

7) methods of study of Machiavellian personality, which determines a person's tendency to manipulate other people in interpersonal relationships;

8) methods of assessing the communicative and organizational abilities of the KOZ-2 personality for studying communicative and organizational inclinations and identifying potential opportunities of the individual in the development of his communicative and organizational abilities, which was used in the process of primary professional consultation;

9) methods of diagnostics of motivation for success of T. Ehlers for studying motivation for achievement of success.

Experimental work was carried out in 2014-2017 at the National Technical University "Kharkiv Polytechnic Institute", O.M. Beketov National University of Urban Economy in Kharkiv, Ukrainian Engineering Pedagogics Academy, Kharkiv National Automobile and Highway University.

The experiment involved engineering Students (388 people) and 22 teachers of the above-mentioned institutions of higher technical education. All the participants were second and third year students. To ensure the quality of the next stage of the experiment, two groups were formed on the level of leadership qualities development: the experimental group (201 students) and control group (187 students). All the participants of the experiment were informed about the participation conditions beforehand and gave their personal agreement to take part in the experiment. The absence of significant differences on the level of indicators of the leadership position formation of future engineers was confirmed by the use of statistical methods.

Using the author's psychodiagnostic questionnaire, individuals from the experimental group were selected using quantitative and qualitative assessment criteria. The composition of the experimental sample qualitatively and quantitatively represents the general population, since the techniques of modeling and randomization were used for its formation. The experimental plan used, the methods of statistical processing, its conduct, and interpretation of the results ensured internal and external validity. The control group was composed of students of the above-mentioned educational institutions. During the experiment, ethical standards were observed for its participants. The experiment was approved by the Academic Council of the National Technical University "Kharkiv Polytechnic Institute" (protocol # 3 of November 17, 2015) and agreed by the Interagency Council for the Coordination of Scientific Research on Pedagogical and Psychological Sciences in Ukraine (protocol # 8 of December 15, 2015).

The pedagogical experiment was conducted during 2014-2017. The experiment contained traditional stages for pedagogical research: ascertaining, forming and controlling.

According to the results of the statement stage of the experiment, it was determined that: up to 23.96% of students who were involved in diagnostics can be attributed to the high level of leadership position formation; the distribution of respondents by the level of formation of the components of leadership position within academic groups is extremely uneven.

Determining the effectiveness of the influence of pedagogical conditions for the formation of the leadership position of future engineers in the educational process required a comparison of ascertaining and control data on the formation of the leadership positions of students of experimental and control groups. At the formative stage of the study,

pedagogical conditions for forming the leadership position of future engineers in higher technical education institutions were consistently introduced.

To obtain data for comparison at the control stage of the experiment, a re-diagnosis of the formation of the leadership position of future engineers was carried out, which was conducted similarly to the one at the ascertaining stage. For this purpose, the same diagnostic and research methods were used to study the components of student leadership.

To check the effectiveness of the experimental work the dynamics of changes in the components of the leadership position of the respondents individually were compared to the level of formation of such a position.

At the control phase of the study in the experimental group were determined significant percentage increases in the number of students with high levels of development indicators and negative percentage increases in the number of students with medium and low levels in terms of all criteria for the formation of the leadership position of a future engineer. Such a trend was not identified in the control group, whose educational process did not introduce pedagogical conditions for forming the leadership position of future engineers.

Significant shifts in the results identified in the experimental group are related to the introduction of the author's pedagogical conditions, which has proven effectiveness and can be widely used to develop various components of the leadership position of a future specialist, which testifies to the achievement of the goal of the study and to prove its hypothesis.

Future engineers were involved in the activities held within the winter camp at the Yalinka health resort located in the village of Dachny Zmiev district of Kharkiv region. Students worked as tutors in this camp from December 28, 2014, to January 17, 2015, from December 27, 2015, to January 16, 2016, from December 25, 2016 to January 14, 2017. Only students from the experimental group were selected to work in the camp. They worked with groups of children of 20 or more.

4. Results

According to the results of the statement stage of the experiment, it was determined that: up to 23.96% of students, who were involved in diagnostics, attributed to the high level of leadership position formation; though the distribution of respondents by the level of formation of components of leadership position within academic groups is extremely uneven. To ensure the quality of the next stage of the experiment were

formed two equivalents in the level of development of leadership qualities of the group. The absence of significant differences in the level of formation of indicators of the leadership position of future engineers was confirmed by the use of statistical methods, namely by the personal-reflective criterion.

Determining the effectiveness of the influence of pedagogical conditions for the formation of the leadership position of future engineers in the educational process required a comparison of ascertaining and control data on the formation of the leadership positions of students of experimental and control groups (table 1).

Table 1. Summarized results of experimental work on forming a leadership position (%)

Source: Authors own conception

Criteria and indicators	Group	The level of readiness of the leadership position					
		Before the experiment			After the experiment		
		L	M	H	L	M	H
Motivational-value criterion							
Attitudes of students to formation and shaping of leadership position	EG	14.4	51,74	33.8	1.0	59.7	39.3
	CG	12.8	52,4	34.7	8.5	54.5	36.9
Valuable attitude towards group interests in the professional field	EG	2.9	37.8	59.2	1	34.8	64.1
	CG	3.2	36.8	59.8	1.0	37.9	60.9
The ability to understand the moral content of the profession	EG	0	23.8	76.1	0	12.9	87.0
	CG	0	21.9	78.0	0	19.7	80.2
The ability to detect the essence of moral	EG	2.9	79.1	17.9	0	71.1	28.8
	CG	3.7	79.1	17.1	2.1	79.6	18.1
Motivation for success	EG	1	39.8	59,2	0	31.3	68.6
	CG	1.0	40.6	58.2	0	41.1	58.8
Cognitive-behavioral criterion							
Understanding leadership factors	EG	6,97	53.7	39.3	3.9	53.2	42.7
	CG	5,88	56.6	37.4	6.3.	54.5	39.0

Formation of the Leadership Position of Professionals in Higher Education ...
Liudmyla SHELESTOVA, et al.

Cognitive, communication and organizational skills	EG	9,95	51.7	38.3	4.9.	43.7	51.2
	CG	11,22	54.0	34.7	9.6	55.6	34.7
Self-esteem for the ability to exercise leadership	EG	0	39.3	60.6	0	30.8	69.1
	CG	0	41.1	58.8	0	39.0	60.9
The ability to convince others	EG	31.3	56.7	11.9	22.8	58.2	18.9
	CG	28.3	56.1	15.5	27.2	57.7	14.9
The ability to display knowledge in behavior	EG	13.9	71.1	14.9	5.9	70.1	23.8
	CG	1,9	72.7	12.2	10.6	75.4	13.9
Personality-reflexive criterion							
Personal qualities	EG	37.8	57.7	4.4	28.8	60.1	10.9
	CG	39.0	55.0	5.8	36.8	56.1	6.9
Reflexive skills	EG	18.9	58.7	22.3	9.9	60.2	29.84
	CG	18.1	57.2	24.5	17.1	54.5	28.34

In order to obtain data for comparison at the control stage of the experiment was carried out a re-diagnosis of the formation of the leadership position of future engineers, which was conducted similarly to the one at the ascertaining stage. For this purpose, the same diagnostic and research methods were used to study the components of student leadership.

To check the effectiveness of the experimental work the dynamics of changes in the components of the leadership position of the respondents individually were compared to the level of formation of such a position.

At the control phase of the study in the experimental group were determined significant percentage increases in the number of persons with high levels of development indicators and negative percentage increases in the number of persons with medium and low levels in terms of all criteria for the formation of the leadership position of a future engineer. Such a trend was not identified in the control group, whose educational process did not introduce pedagogical conditions for forming the leadership position of future engineers (table 2).

Table 2. The level of readiness of the leadership position of future engineers

Source: Authors own conception

Development level	Experimental group				Control group			
	Before the experiment		After the experiment		Before the experiment		After the experiment	
	Number	%	Number	%	Number	%	Number	%
High	48	23.8	78	38.8	45	24.06	62	31.5
Satisfactory	101	50.2	109	54.2	100	53.4	107	57.2
Low	52	25.8	14	6.96	42	22.4	21	11.2
Total	201	100	201	100	187	100	187	100

Significant shifts in the results identified in the experimental group are related to the introduction of the author's pedagogical conditions, which has proven effective and can be widely used to develop various components of the leadership position of a future specialist, which testifies to the achievement of the goal of the study and to prove its hypothesis.

It is important to analyze the functions that the formal leader in the student group relies on. We consider it necessary to distinguish four basic functions of a formal student leader: information; control; managerial; psychological.

5. Conclusions

As a result of the research, the pedagogical conditions for forming the leadership position of future engineers in higher technical education institutions are theoretically substantiated and realized: engaging students in practical independent activity, which involves the use of organizational, communicative, cognitive, reflective skills, and conditioning skills; modeling of professionally oriented tasks, which require students to choose the best ways of leadership influence in situations of dialogic and group interaction; nurturing a valuable attitude to leadership in out-of-class and classroom work.

The conducted pedagogical experiment confirmed the effectiveness of pedagogical conditions for forming the leadership position of future engineers in higher technical education institutions. Assessment of the level of leadership position formation by refined criteria and indicators (motivational-value, cognitive-behavioral, personality-reflexive) in the control and experimental group proves the positive influence of the

implementation of theoretically substantiated pedagogical conditions on the changes in pedagogical conditions. Thus, at the control stage of the experiment, the number of students with a high level of leadership position formation in the experimental group increased by 14.93%, and with a low level decreased by 18.91%, respectively. At the same time, in the control group, the level of leadership position formation did not change significantly. The number of students with low leadership positions decreased by only 11.23%.

The results of the pedagogical experiment confirm the feasibility of introducing the developed pedagogical conditions for forming the leadership position of future engineers in the educational process of higher technical education institutions.

The research, of course, does not exhaust all aspects of this problem. Perspectives for further scientific search are the issues of preparation of the teaching staff and other organizers of the educational process for the formation of the leadership position of future engineers in higher technical education institutions, as well as the question of the formation of leadership position in future specialists of other professional orientation.

References

- Akdere, M., Hickman, L., & Kirchner, M. (2019). Developing leadership competencies for STEM fields: The case of Purdue Polytechnic Leadership Academy. *Advances in Developing Human Resources*, 21(1), 49-71. <https://doi.org/10.1177/1523422318814546>
- Alba-Flores, R., & Rios, F. (2019). Incorporating peer review techniques to enhance students' communication skills and team performance in engineering capstone projects. *International Journal Of Engineering Education*, 35(6), 969-982.
- Antonio Florez, W. (2019). Embodying engineering leadership Learning from the implementation of the engineering leadership program. *Kybernetes*, 48(7), 1547-1562. <https://doi.org/10.1108/K-05-2018-0242>
- Balderas, A., Caballero-Hernández, J. A., Dodero, J. M., Palomo-Duarte, M., & Ruiz-Rube, I. (2019). Model-driven skills assessment in knowledge management systems. *Journal of Web Engineering*, 18(4), 353-380. <https://doi.org/10.13052/jwe1540-9589.18464>
- Bilimoria, D., & Singer, L. T. (2019). Institutions developing excellence in academic leadership (IDEAL). *Equality, Diversity and Inclusion: An International Journal*, 5(2), 9-17. <https://doi.org/10.1108/EDI-10-2017-0209>
- Corriveau, A. M. (2020). Developing authentic leadership as a starting point to responsible management: A Canadian university case study. *The International*

- Journal of Management Education*, 18(1), 100364.
<https://doi.org/10.1016/j.jime.2020.100364>
- Fetiskin, N. P., Kozlov, V. V., & Manuilov, G. M. (2002). *Sotsialno-psihologicheskaya diagnostika razvitiya lichnosti i malyyh grupp* [Socio-psychological diagnostics of personality and small group development]. Izdatelstvo Instituta Psihoterapii.
- Floris, M., Wiblen, S. L., & Anichenko, E. (2020). Senior project leadership skills and career stallers: Analysis of perception differences and implications for careers. *Project Management Journal*, 87(6), 60-74.
<https://doi.org/10.1177/8756972820907491>
- French, R. P. (2016). Deconstructing the end of leadership: postmodernity, epistemology, and worldviews. *SAGE Open*, 6(1), 1-10.
<https://doi.org/10.1177/2158244016628588>
- Ghazalan, M. S., Ab Halim, F., Hamidon, N. I., Hariri, T. I. A. A., Sallehuddin, S. A., Bahrol, K., Zakaria, N., & Roddin, R. (2019). Engineering students' generic skills after industrial training: employers' perception. *Journal of Technical Education and Training*, 11(2), 78-98.
<https://doi.org/10.30880/jtet.2019.11.02.006>
- Hanapi, Z., Mamat, A. B., Zulkifli, R. M., Sharif, M. S., & Hasnan, K. A. (2018). Development of employability skills measurement model among engineering graduates of community college using Delphi technique and confirmatory factor analysis. *Advanced Science Letters*, 24(4), 660-664.
<https://doi.org/10.1166/asl.2018.11028>
- Handley, M., & Berdanier, C. G. (2019). Operationalizing interpersonal behaviours of leadership for early-career engineers. *International Journal of Engineering Education*, 35(3), 719-732.
- Holmberg, R. (2016). Developing leadership skills and resilience in turbulent times: A quasi-experimental evaluation study. *Journal of Management Development*, 35(2), 154-169. <https://doi.org/10.1108/jmd-09-2014-0093>
- Ilyin, E. P. (2002). Motivacija i motivy [*Motivation and motives*]. Peter.
- Jensen, J. R., Neck, C. P., & Beaulieu, R. J. (2018). The self-action leadership existential paradigm introducing a post-postmodern pedagogical philosophy in promotion of self-leadership and character education. *Journal of Leadership and Management*, 3(13), 167-184.
<https://doi.org/10.20944/preprints201607.0070.v1>
- Kniffin, L. E., & Patterson, R. M. (2019). Re-Imagining community leadership development in the post-industrial era. *Journal of Leadership Education*, 18(4), 188-205. <https://doi.org/10.12806/V18/I4/T1>
- Main, J. B., Camacho, M. M., Mobley, C., Brawner, C. E., Lord, S. M., & Kesim, H. (2019). Technically and tactically proficient: How military leadership

- training and experiences are enacted in engineering education. *The International Journal of Engineering Education*, 35(2), 446-457.
- Mazzetto, S. (2019). A practical, multidisciplinary approach for assessing leadership in project management education. *Journal of Applied Research in Higher Education*, 11(1), 50-65. <https://doi.org/10.1108/JARHE-04-2018-0055>
- Miller, L., & Miller, A. F. (2020). Innovative work behavior through high-quality leadership. *International Journal of Innovation Science*, 12(2), 219-236. <https://doi.org/10.1108/IJIS-04-2019-0042>
- Paoletti, J., Bisbey, T. M., Reyes, D. L., Wettergreen, M. A., & Salas, E. (2020). A checklist to diagnose teamwork in engineering education. *International Journal Of Engineering Education*, 36(1), 365-377.
- Rottmann, C., Sacks, R., & Reeve, D. (2015). Engineering leadership: Grounding leadership theory in engineers' professional identities. *Leadership*, 11(3), 351-373. <https://doi.org/10.1177/1742715014543581>
- Sandu, A., & Unguru, E. (2018). Could neuroenhancement be an ethical approach in social practice?. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 9(SI), 21-29. <https://lumenpublishing.com/journals/index.php/brain/article/view/2110>
- Shportun, O., Branitska, T., Kaplinsky, V., Zharovska, O., Baiurko, N., & Siryk, E. (2020). Peculiarities of leadership manifestation in the youth social group. *Revista Romaneasca pentru Educatie Multidimensionala*, 12(1Sup1), 304-329. <https://doi.org/10.18662/rrem/12.1sup1/237>
- Tabrizi, S., & Rideout, G. (2016). Styles of educational leadership for modernist and postmodernist approaches. *International Journal for Infonomics (IJI)*, 9(4), 1239-1246. <https://doi.org/10.20533/iji.1742.4712.2016.0152>
- Yezhova, O. V., Pashkevich, K. L., & Manoilenko, N. V. (2018). Comparative analysis of foreign models of fashion education. *Revista Românească pentru Educație Multidimensională*, 10(2), 88-101. <https://doi.org/10.18662/rrem/48>