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GENDER AND PEDAGOGICAL ASPECTS OF CAREER ORIENTATION OF EDUCATIONAL ORGANIZATION MANAGERS

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Career orientations are studied in psychological and pedagogical science in the context of solving the problem of developing life plans. Today, there is no doubt about the need to transform public gender consciousness. This has prompted the adoption of the Gender Equality Strategy in the Republic of Kazakhstan, one of the objectives of which is to develop “new models of gender self-awareness”. The aim of this study is to identify and analyze gender differences in the axiological sphere, particularly in the career orientations of educational institution leaders. Career orientations are defined as specific forms of expression of individual value orientations and social attitudes that determine the choice of professional strategies, leadership style, and the specifics of organizational behavior. The study emphasizes that career attitudes not

only shape individual professional trajectories but also contribute to the creation of a favorable psychological climate within the team. The results of the experimental study confirmed the primary hypothesis: a gender balance in the behavioral characteristics of managers working in tandem is essential for high social management effectiveness, as measured by employee satisfaction. The empirical results revealed significant, complementary differences between male and female leaders. This complementarity fosters a sustainable gender balance in managerial behavior and contributes to the improved performance of educational institutions.

Key words: value orientations, career orientations, management styles, managers, gender differences.

БІЛІМ БЕРУ ҰЙЫМДАРЫ БАСШЫЛАРЫНЫҢ МАНСАПТЫҚ БАҒДАРЛАРЫНЫҢ ГЕНДЕРЛІК-ПЕДАГОГИКАЛЫҚ АСПЕКТІСІ

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Мансаптық бағдарлар психологиялық-педагогикалық ғылымда өмірлік жоспарларды құру мәселесін шешу мәселесінде зерттеледі. Бүгінгі таңда қоғамдық гендерлік сананы өзгерту қажеттілігіне күмән жоқ. Бұл Қазақстан Республикасында Гендерлік теңдік стратегиясын қабылдауға түрткі болды, оның мақсаттарының бірі «гендерлік өзін-өзі танудың жаңа модельдерін» әзірлеу болып табылады. Бұл зерттеудің мақсаты – аксиологиялық сферадағы, атап айтқанда, білім беру ұйымы басшыларының карьералық бағдарларында гендерлік айырмашылықтарды анықтау және талдау, Карьералық бағдарлар кәсіби стратегияларды таңдауды, көшбасшылық стильді және ұйымдық мінез-құлық ерекшеліктерін анықтайтын жеке құндылық бағдарлары мен әлеуметтік қатынасты көрсетудің нақты нысандары ретінде анықталады. Зерттеуде мансаптық көзқарастар жеке кәсіби траекторияларды қалыптастырып қана қоймайды, сонымен қатар ұжымда қолайлы психологиялық климатты құруға ықпал ететіні атап көрсетілген. Эксперименттік зерттеу нәтижелері негізгі гипотезаны растады: тандемде жұмыс істейтін менеджерлердің мінез-құлық сипаттамаларындағы гендерлік тепе-теңдік қызметкерлердің қанағаттануымен өлшенетін әлеуметтік басқарудың жоғары тиімділігі үшін өте маңызды. Эмпирикалық нәтижелер ерлер мен әйелдер басшыларының арасындағы елеулі, бір-бірін толықтыратын айырмашылықтарды анықтады. Бұл бірін-бірі толықтыру басқарушылық мінез-құлықтағы тұрақты гендерлік тепе-теңдікті қамтамасыз етеді және оқу орындарының жұмысын жақсартуға ықпал етеді.

Түйінді сөздер: құндылық бағдарлары, карьералық бағдарлар, басқару стильдері, көшбасшылар, гендерлік айырмашылықтар.

ГЕНДЕРНО-ПЕДАГОГИЧЕСКИЙ АСПЕКТ КАРЬЕРНЫХ ОРИЕНТАЦИЙ РУКОВОДИТЕЛЕЙ ОРГАНИЗАЦИЙ ОБРАЗОВАНИЯ

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Карьерные ориентации изучаются в психолого-педагогической науке в рамках решения проблемы построения жизненных планов. Сегодня нет сомнений в необходимости изменения общественного гендерного сознания. Это послужило толчком к принятию в Республике Казахстан Стратегии гендерного равенства, одной из целей которой является разработка «новых моделей гендерного самопознания». Целью данного исследования является выявление и анализ гендерных различий в аксиологической сфере, в частности, в карьерных ориентациях руководителей образовательных учреждений. Под карьерными ориентациями понимаются особые формы проявления

ценностных ориентаций личности и социальных установок, определяющих выбор профессиональных стратегий, стиль руководства и специфику организационного поведения. В работе акцентируется внимание на том, что карьерные установки формируют не только индивидуальные профессиональные траектории, но и вносят вклад в создание благоприятного психологического климата в коллективе. Результаты экспериментального исследования подтвердили основную гипотезу: гендерный баланс в поведенческих характеристиках менеджеров, работающих в тандеме, имеет решающее значение для высокой эффективности социального управления, измеряемой удовлетворенностью сотрудников. Полученные эмпирические результаты показали наличие значимых различий между мужчинами и женщинами-руководителями, которые носят комплементарный характер. Такая взаимодополняемость формирует устойчивый гендерный баланс в управленческом поведении и способствует повышению эффективности функционирования образовательных организаций.

Ключевые слова: *ценностные ориентации, карьерные ориентации, стили управления, руководители, гендерные различия.*

Introduction. Career orientations are studied in psychological and pedagogical science in the context of solving the problem of developing life plans. Since, in modern conditions, schools do not pay the same attention to career guidance issues, the research object is primarily students. The focus is on studying the motivation for the career preferences of student youth in the process of preparing for professional activity. The problem is due, firstly, to the fact that in the new conditions, those with an egalitarian gender identity have psychological advantages in adaptation and psychological well-being (R. E. Pauletti, M. Menon, P. J. Cooper; C. D. Aults, D. G. Perry; M. L. Dean, C. C. Tate; K. Deaux, L. L. Lewis and others). Although the mentioned studies have shown that gender balance and egalitarian gender identity have a positive impact on an individual's psychological adaptation, most of them have been conducted in the context of student youth or the general population. These studies have not sufficiently addressed the impact of gender identity on supervisory behavior in professional management, particularly in educational organizations. Additionally, while some authors interpret gender identity as a resource for an individual's adaptation, other researchers view it as a result of social norms and cultural stereotypes. Secondly, it plays an important role in the development of the quality of human capital, which influences the progressive development of the individual and society as a whole. The transformation of public gender consciousness towards egalitarianism is a condition for self-actualization of women and men (S.J. Rogers, P.R. Amato; G. Kaufman, P. Uhlenberg; K. Donnelly, J.M. Twenge; A.H. Eagly, V.J. Steffen and others). The authors mentioned emphasize the role of gender equality in improving the quality of human capital, their works often focus on macro-social or family-related issues. While the transformation of gender consciousness towards equality is seen as a prerequisite for personal fulfillment, specific mechanisms in the context of management and educational leadership are not systematically analyzed. While some studies approach gender equality from a structural and functional perspective, linking it to economic efficiency, others now prioritize personal development and the flexibility of social roles. Thirdly, the influence of persistent traditional gender stereotypes and prejudices on the attitude towards women in the professional and family spheres. Their negative effects are discrimination at work and domestic violence (B. Rottweiler B, C. Clemmow, P. Gilla; T.A. Kupers; I.K. Broverman, S.R. Vogel; J.H. Duckitt; M.E. Heilman, A.H. Eagly and others). These studies demonstrate that traditional gender stereotypes significantly influence perceptions of women's professional and family roles. However, many of these studies focus on gender discrimination as a socio-psychological phenomenon and do not specifically address its impact on management practices, particularly in educational institutions. While some authors explain gender stereotypes at a structural level, leading to inequality in the labor market, others explore them through the lens of interpersonal perception and evaluation. In addition, the phenomenon of skepticism towards professional competence in relation to female leaders and the phenomenon of the "glass ceiling" have not been sufficiently empirically studied in the context of educational management. In Kazakhstan, the increase in domestic violence, including fatalities, has necessitated criminal punishment and an increase in the staff of special units for the protection of women [1]. According to a study by K. Goldin, cited by the Halyk Research group, in Kazakhstan, in all sectors of the economy, except for education, the gender pay gap persists, which is higher than the world average. In 2022, women's wages in Kazakhstan were ¼ less than men's. The main reason is the preservation of traditional gender roles in the family, women working two shifts – at the workplace and at home [2]. Fourth, the impact of wage discrimination against women on the growth of the country's economy, which receives less income, which is reflected in the material well-being of all Kazakhstanis [2, p. 2]. In studies on the impact of gender inequality in wages on the country's economic growth, the issue is primarily addressed at the macroeconomic level. These studies demonstrate that women's low income indirectly affects the gross domestic product, tax revenues, and the material well-being of the population. However, these studies do not sufficiently analyze the mechanisms of economic inequality's impact on the management structure in the education sector, personnel policies, and professional motivation. Additionally, the influence of wage disparities on professional self-esteem, career aspirations, and management practices in the education sector requires further empirical research. From this perspective, the study of gender-related economic inequality in relation to management activities in educational

organizations is scientifically novel and practically significant. Fifth, the significance of the state of gender self-awareness is conditioned by the international obligations of Kazakhstan, which it assumed as a subject of the world community after gaining sovereignty. They cover a wide range of areas: the Beijing Platform for Action for the Advancement of Women, as well as the UN Convention on the Elimination of All Forms of Discrimination against Women, the ILO Convention on Equal Remuneration and the Convention on the Political Rights of Women [3-6]. The Constitution of the Republic of Kazakhstan prohibits discrimination on the basis of gender [7]. The fundamental documents are: the "Gender Equality Strategy of the Republic of Kazakhstan", the law "On State Guarantees of Equal Rights and Equal Opportunities for Men and Women", and the "Concept of Family and Gender Policy in the Republic of Kazakhstan until 2030" [8-10]. Their implementation should lead to equality and promote increased gender tolerance in society. These international and national documents establish gender equality at the legal level and define the institutional framework. However, the scientific literature does not sufficiently analyze the impact of legal norms on real management practices, especially on pedagogical management in educational organizations. In most cases, gender policies are described at the level of strategic documents, and the mechanisms for their transformation into internal organizational culture, management style, and leadership models are ignored. Additionally, the issue of the gap between legal provisions and real social and pedagogical practices has not been fully addressed. In this regard, an empirical study of the formation of gender identity and its impact on managerial behavior in educational organizations is relevant.

At the global level, organizations such as the UN, WEF, OECD, and the World Development Bank consider and focus on human development indices, gender gap indices, gender development indices, the SDG gender index, and others. Common to all indices is that gender equality is one of the key indicators or areas. Kazakhstan's position on the Global Gender Gap Index is unstable. In 2022, Kazakhstan did not reach the global midpoint in the Global Gender Gap Index [11]. According to a 2020 study of the Social Gender Norms Index, it was found that over 90% of Kazakhstan's residents adhere to patriarchal gender stereotypes [12].

Today, there is no doubt about the need to transform public gender consciousness. This has prompted the adoption of the Gender Equality Strategy in the Republic of Kazakhstan, one of the objectives of which is to develop "new models of gender self-awareness".

The scientific novelty of the study lies in the comprehensive gender-pedagogical analysis of the career orientations of the heads of educational organizations. For the first time, the study examined the value orientations, management styles, and managerial skills of male and female heads in relation to the quality of the educational process and the socio-psychological climate of the educational organization. The study empirically demonstrated that gender characteristics contribute not only to the effectiveness of management, but also to the professional interaction of the teaching staff, the culture of cooperation, and the stability of the educational environment. The study also proved that gender balance in management is a factor that influences the harmonious development of the educational system.

The following hypotheses were put forward during the study: gender-related pedagogical differences in the career orientations of male and female managers determine their management style and the specifics of pedagogical interaction; the complementarity of the management skills of male and female managers contributes to the formation of a favorable pedagogical environment in an educational organization; gender balance in management enhances the professional efficiency of the teaching staff and the level of employee satisfaction.

The purpose of this study is to identify and analyze gender differences in the axiological sphere, specifically in the career orientations of educational institution leaders.

Materials and methods. Career orientations represent a special case of value orientations. Of fundamental methodological significance is the fact that value orientations influence the direction of the individual. Accordingly, they influence the characteristics of the holistic system of relationships with oneself, others, and those around one, i.e., the worldview and individual philosophical conception of life. Thus, they act as a powerful motivator that organizes behavioral patterns and methods for achieving goals in all spheres of human activity. It is no coincidence, as V.A. Chiker notes, that in American social psychology, the concept of value orientations in the professional sphere coincides with the concept of career orientations, or so-called career anchors [4]. In psychological science, a career, as G.S. Nikiforov and M.A. Dmitrieva emphasize, is defined not only as a type of specific occupation, but also as a path to professional success [5]. In particular, in social psychology, acmeology, and management psychology, the concept of a career reflects a system of social attitudes, or attitudes. Their determining function at the level of individual behavior is manifested in their behavior patterns and goal-achievement characteristics.

In general, career orientations, firstly, are recognized by the individual to varying degrees. Secondly, as values and attitudes, they are characterized by relative stability, influencing the behavior of individuals, including managers, which is perceived in a certain way by subordinates. This issue has not previously been studied in psychological science.

The authors of this article examined this issue while verifying a hypothesis about the influence of gender balance in the behavioral characteristics of managers working in tandem on the high social performance of an organization. According to authoritative scholars, employee satisfaction is an indicator of

social success (G.V. Leonidova, N.V. Minenko, V.P. Pugachev, N.I. Churakova, N.V. Shutova, and others). Gender balance refers to the mutual complementarity of skills that are expressed to varying degrees in male and female managers.

The hypothesis was based, among other things, on the assumption that organizational effectiveness is influenced by gender balance, which is determined by different styles, which, in turn, are influenced by the motivating value orientations of the manager.

Results and discussion. The study focused on top and middle managers at educational institutions in Semey. Career orientations were assessed using E. Schein's "Career Anchors" test, adapted by V.A. Chiker.

The test data revealed hierarchies of value orientations among managers (male and female): professional competence, management, autonomy, stability, service, challenge, lifestyle integration, and entrepreneurship. According to the average values, the most significant triad for men is the orientation triad related to challenge (19.9 points), entrepreneurship (18 points), and autonomy (13.7 points) (Figure 1).

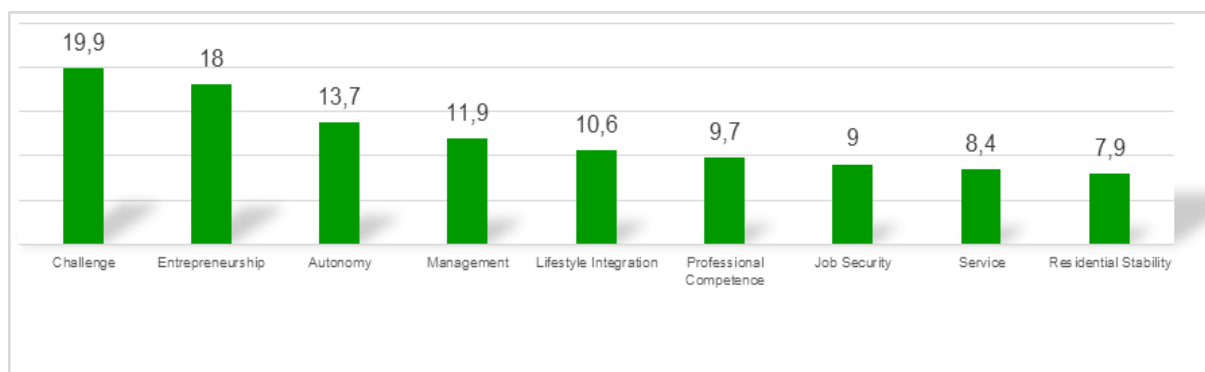


Figure 1 – Career orientations of male managers

This means that men's behavior in activities motivated by such values is characterized by competition and rivalry in the service market, the desire to triumph over competitors, overcoming barriers and difficulties, and solving unconventional problems to achieve their goals. For them, victory is a priority, even if everything is at stake and there is no absolute guarantee. It is this exciting process leading to victory, rather than any specific area of activity itself, that is of primary importance. Hence, their values, which allow them to be open to everything new, a desire to innovate, and a lack of fear of external threats and risks, are natural. Managers who embody such values can rightfully say, "I did it!"

Entrepreneurship as a value orientation is manifested in male managers willingness to creatively develop what is still new in the service market (18 points). It is crucial to play an independent and leading role. For example, independently creating their own production of new goods and services, i.e. Their own "brainchild," where the most important thing is that it's their own, under their own name, brand, or logo, etc. Hence, the natural tendency among managers is to assume a position of authority as a sole proprietor and a focus on autonomy (13.7 points). This, in essence, dictates a desire to do everything and decide everything themselves, to be free from any kind of regulations, rules, or limitations that might constrain them, limiting their initiative and independence.

To understand what drives managers, it's important to consider the least significant orientations, those that occupy the lowest ranks in the hierarchy. Men's rejection of the value orientations of residential stability (7.9 points) and service (8.4 points) means they will readily leave home or the region they live in to work anywhere where they can fully realize their values and needs, as described above. Since the process of striving for victory is their priority, regardless of the field of activity, this explains the negligible significance of the orientation associated with job stability (9 points). They strive more for interesting and exciting work than for one that guarantees stability (salary, position, etc.). They are more focused on their personal needs for satisfying ambitions, new achievements, and accomplishments. For this reason, the orientation of service (to people, humanity, etc.) apparently has no significance for them (8.4 points). Even the creation of new products and services is motivated more by the values of the dominant orientations of entrepreneurship and challenge than by the desire to improve the world for people.

Meanwhile, all these orientations, manifested in behavioral motives, form different management styles. In accordance with the study's objective, the Zakharov test and interviews were used to examine the behavior of managers as perceived by their subordinates.

According to the data obtained, male managers in their practice of managing effective companies more often employ an authoritarian management style (64%) (Table 1). It is noteworthy that this style is almost three times more preferred than the democratic style (22%). Meanwhile, the permissive style is virtually ignored, not used, and accounts for 14%.

Table 1 – Values of indicators of management styles with a high level of effectiveness

Styles	Authoritarian	Democratic	Liberal
Males			
1. D.B-n	64%	27%	11%
2. L.S-ov	63%	15%	18%
3. S.S-in	68%	21%	17%
4. D.lbr-v	60%	19%	12%
5. V.OI-n	62%	23%	10%
6. G.Br-v	66%	22%	14%
7. O.G-ev	65%	25%	16%
Average values	64%	22%	14%
Females			
1. N.Ush-va	33%	57%	15%
2. R.A-na	35%	54%	17%
3. O.K-va	31%	55%	11%
4. T. S-к	32%	53%	9%
5. M.Yu	29%	56%	11%
Average values	151 (32%)	264 (55%)	65 (13%)

Despite the authoritarian management style of men, employees experience job satisfaction because, thanks to their strengths, they have a clear and specific vision of strategic goals, an understanding of the company's direction, and how these goals will be achieved. Men excel at this aspect of management, thereby inspiring their subordinates. The organization's success, despite the authoritarian management of male managers, is determined by two factors. The first, according to a content analysis of interview results, is that the costs of this style are offset by the authority derived from the strengths of male managers:

- Competence and intelligence – 72%;
- Meeting commitments and responsibility – 69%;
- Focus on results – 92%;
- Courage, risk-taking, ambition, and innovative thinking – 85%.

The second reason is the complementarity of their styles with the female management style, which will be discussed below in the context of the female hierarchy of value orientations. The triad of values of lifestyle integration (19 points), management (18.6 points), and job stability (15.9 points) ranks first (Figure 2). While male managers are almost entirely absorbed by their "brainchild"—the company—women don't consider themselves to have a choice: either family or work. The activities and behavior of female managers are significantly influenced by the desire to integrate these two interests and balance family and work-related ones. Self-development and career development are linked to an interest in improving the quality of life for their family, not just the company. This is one factor in their behavior, which is aimed at responsiveness to criticism from subordinates and learning from them in areas where they feel weaker and less competent. It should be noted that in the companies studied, female managers occupied a subordinate position relative to the top male manager.

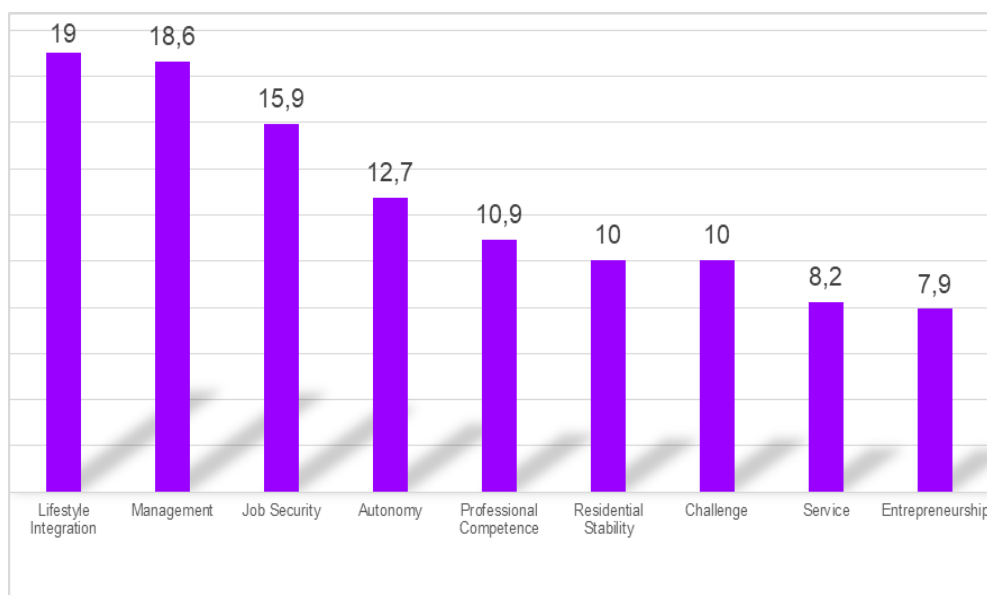


Figure 2 – Career orientations of female managers

A management orientation significantly influences responsible behavior for work results, a desire to integrate various functions, and a desire to demonstrate flexibility in communication and interaction with employees. Unlike male executives with high potential for winning ambition, female executives are primarily motivated by the need for security and stability. The latter provides them with a certain level of certainty and predictability. It's no coincidence that job stability is also a priority. For female executives, it's important that the company they work for is reliable, caring, and stable (without the risk of bankruptcy, loss of competitiveness, etc.). This influences their attitudes and behavior. Specifically, they strive to maintain and support an optimal internal corporate environment through management functions such as monitoring, motivating, and supporting employees, creating a favorable psychological climate, etc.

Managerial motivation: Career value orientations of women executives. The critical values were $U_{crit} = 11$ ($p \leq 0.05$) and $U_{crit} = 6$ ($p \leq 0.01$). The empirical U values for the orientations in which gender differences were identified fell within the significance zone.

An analysis of the orientations that are least significant for women also reveals differences. Their behavior is largely unaffected by values associated with entrepreneurship (7.9 points) and challenge (10 points), while these are a priority for male managers (18 points and 19.9 points, respectively).

This means that they do not strive for competition and victory, as do men. They are more likely to be motivated by avoiding failure than by achieving success, or by winning at any cost. This is especially true when working in uncertain or turbulent, rapidly changing environments that involve risk and overcoming barriers and difficulties. They do not strive for the right to be pioneers or managers, or to determine everything in the organization based on the principles of one-man management. However, women have in common with men that their behavior is least influenced by a service orientation (8.4 and 8.2 points, respectively).

The statistical significance of gender differences in value orientations was tested using the Mann-Whitney U-test (Table 2).

Table 2 – Statistical Significance of Gender Differences in Career Value Orientations (U-test)

Orientations	Males	Females	Mann-Whitney U test
Professional Competence	9,7	10,9	$U_{emp} = 14$ $U_{emp} > U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone
Management	11,9	18,6	$U_{emp} = 0,1$ $U_{emp} \leq U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone
Autonomy	13,7	12,7	$U_{emp} = 16,5$ $U_{emp} > U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone
Job Security	9	15,9	$U_{emp} = 0$ $U_{emp} \leq U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone
Residential Security	7,9	10	$U_{emp} = 7,5$ $U_{emp} > U_{crit} (p \leq 0.05)$ $U_{emp} \leq U_{crit} (p \leq 0.01)$ U_{emp} in the insignificance zone
Service	8,4	8,2	$U_{emp} = 22,5$ $U_{emp} > U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone
Challenge	19,9	10	$U_{emp} = 0,1$ $U_{emp} \leq U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone
Lifestyle Integration	10,6	19	$U_{emp} = 0$ $U_{emp} \leq U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone
Entrepreneurship	18	7,9	$U_{emp} = 0,2$ $U_{emp} \leq U_{crit} (p \leq 0.05)$ U_{emp} in the insignificance zone

Thus, testing of statistical hypotheses confirmed, at a significant level, a significant predominance of orientations toward management, lifestyle integration, and job stability among female managers ($p \leq 0.01$; $p \leq 0.05$), while among men, orientations reflecting the need for entrepreneurship and responding to challenges ($p \leq 0.05$) prevailed.

Thus, a comparative analysis of the ranks of orientations in both gender hierarchies indicates their complementary nature. Specifically, the orientations toward challenges and entrepreneurship that are prioritized by men and influence their management style occupy the last ranks in the hierarchy of women's orientations. Meanwhile, orientations toward job stability, management, and lifestyle integration, which are dominant in women's axiological sphere, are in the middle and bottom of the hierarchy in men's hierarchy. Thus, the career orientations of managers are mutually complementary.

The same applies to management styles. Female managers at the same Alikhan Bokeikhan University more often use a democratic management style than an authoritarian one (55% and 32%, respectively), although there is no clear preference, as seen among men (Table 1). According to interviews, the strengths of their management style include the ability to:

- efficiently organize work within the company – 65%;
- build a team and a positive psychological climate – 83%;
- motivate employees by exercising ongoing control over routine processes – 79%;
- interact on a collegial, equal basis – 87%.

Meanwhile, women, like men, in effective companies agree with the liberal management style, avoiding it or very rarely practicing it (13%). This also corresponds to the specific nature of their value orientations. It follows that managers of effective companies, regardless of gender, are the least likely to take a detached position in management. They consider any form of detachment to be inappropriate when resolving serious issues affecting the company. They unaccept a lack of initiative and familiarity with subordinates, as well as situations where they fail to take action themselves and are directed by subordinates. Bottom-up management is not accepted, recognizing that such irresponsibility can damage a manager's reputation and undermine their authority. Furthermore, a permissive style will inevitably lead to decreased productivity and competitiveness due to a formalistic approach to work, indifference to employees, and a lack of systematic monitoring and motivation. Meanwhile, both styles practiced by managers, determined by their sets of value orientations, ensure the kind of management that fosters social effectiveness precisely because of their complementarity. Thus, an organization's success is influenced by the gender balance of management behavioral traits, shaped by the value orientations that define the different management styles.

Organization and methods of the experimental study.

Schools in Semey served as the experimental base.

The study was conducted over two years:

Stage 1 – studying the current state of gender differences in management psychology, organizational psychology, gender management, gender sociology, and economics (analysis of studies, reviews, statistics, and publications);

Stage 2 – identifying current issues and unexplored aspects of gender differences in management;

Stage 3 – selecting standardized methods and conducting the experimental study;

Stage 4 – mathematical and statistical processing of the actual data, interpretation, and preparation of the text.

Since the study of gender differences was conducted in the context of their impact on the social performance of companies, the experimental sample was first selected. It included only those companies whose employees demonstrated a high level of satisfaction (a performance criterion).

A total of 97 people participated in the experimental study, and 15 employees participated in interviews. The study utilized a comprehensive approach, taking into account both subordinate assessments and manager self-assessments. The managers studied included top managers (directors and their deputies), mid-level managers (project managers, and department managers), and 12 other people. Thus, the study involved a total of 109 individuals.

The psychodiagnostic study was conducted in groups for employees and individually for managers. To enhance the reliability of the results, testing and interviews were conducted anonymously.

The following psychodiagnostic methods were used during the empirical study of gender differences in management performance.

Methodology for Assessing Job Satisfaction in a Company

This method was used to assess the level of employee satisfaction with the work organization and management.

Contains questions, the answers to which reflect:

- Company prospects;
- Management style;
- Psychological climate;
- Working conditions;
- Benefits package;
- Remuneration;
- Content of work;
- Opportunity for self-realization;
- Career growth [13].

According to the instructions, subjects rate the questions with the following answers:

3 points – agree, 2 points – don't know, 1 point – disagree.

Clark L. Wilson's "Managerial Skills Cycle" (The Survey of Management Practices)

The test was used as part of a comprehensive approach to studying employee assessments of managers' skills and managers' own self-assessments. This approach minimized subjectivity in assessments of managers' management skills. The test contains 145 questions, divided into eight blocks, consisting of 23 scales. The test manual by V.A. Chiker [14] was used for interpretation.

To determine the level of managers' management skills, only one scale from each phase of the management cycle was used:

Phase I. Scale A. Clarification of goals and objectives.

Phase II. Scale B. Relationships with subordinates.

Phase III. Scale E. Providing necessary working conditions.

Phase IV. Scale F. Feedback.

Phase V. Scale I. Goal motivation (pressure on subordinates),

Scale J. Delegation of authority.

Phase VI. Scale K. Encouragement and recognition of good work results. Questionnaire "Activity-Based Characteristics of Management and Leadership" (A.L. Zhuravlev, V.P. Zakharov).

The methodology includes 16 management situations, the answers to which indicate a specific management style – authoritarian, democratic, or liberal. According to the instructions, subjects select the answer option in each situation that they most prefer in management practice – A, D, L. [15].

Edgar Schein's "Career Anchors" test, adapted by V.A. Chiker and V.E. Vinokurov [14].

The methodology was used to assess priority career value orientations, which constitute the leading system of motivators for managers' activities. According to the author of the test, orientations are stable and can determine motivations for activity over a long period of time. The questionnaire contains eight scales;

The scales reflect key career orientations, or "career anchors" according to E. Schein:

- professional competence;
- management;
- autonomy (independence);
- job stability;
- residential stability;
- service;
- challenge;
- lifestyle integration;
- entrepreneurship.

Mathematical and statistical methods were used to process the obtained data.

Student's t-test

This test was used because it compared mean quantitative indicators whose distribution tended to a normal Gaussian distribution. It was used to assess the significance of gender differences in two unrelated samples–female and male.

The empirical value of the test was determined by the formula:

$$t_e = \frac{|M_1 - M_2|}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$

where M_1 – arithmetic mean of the first sample; M_2 – arithmetic mean of the second sample; σ_1 – standard deviation of the first sample; σ_2 – standard deviation of the second sample; N_1 – size of the first sample; N_2 – size of the second sample. In accordance with the algorithm, the empirical value temp was compared with the critical value t_{crit} .

Mann-Whitney U-test is a special case, an alternative to the Student's t-test. It has also been used to assess the significance of gender differences in two unrelated samples, but the sample sizes are smaller.

The empirical value of the U-test was determined using the formula:

$$U_{emp} = (n_1 \times n_2) + \frac{n_x \times (n_x + 1)}{2} \cdot T_x$$

where n_1 is the number of subjects in sample 1;

n_2 is the number of subjects in sample 2;

T_x is the larger of the two rank sums;

n_x is the number of subjects in the group with the larger rank sum.

Based on the results obtained, the following conclusions were drawn.

• Gender differences in management styles, manifested in behavior, are significantly influenced by differences in the value sphere. The activities of female managers are primarily motivated by the "Management," "Lifestyle Integration," and "Job Security" orientations, while men are motivated by the "Challenge"

and "Entrepreneurship" orientations. Preferred orientations, such as management styles and management skills, are complementary, creating a gender balance. The dominant orientations in the women's hierarchy occupy the middle and last ranks in the men's hierarchy. Gender differences are statistically significant according to the Mann-Whitney U-test ($p \leq 0.05$).

- According to the leading orientations, the specific sphere of activity is not important for male managers. The process of achieving victory and successful results, associated with the ability to overcome obstacles and uncertainty, is important. This explains such behavioral characteristics as authoritarianism and achievement motivation; Focus on results, not people; decisiveness and courage in the face of threats and risks; a desire for innovation, and an interest in the company's innovative development.

- In line with dominant orientations, female managers are equally focused on both work and family. Their activities and behavior are strongly influenced by the need for security through motivation, control, and the creation of a favorable internal corporate environment. This leads to efforts to effectively implement all management functions and work processes to ensure, above all, stability—production, personnel, and results. This also explains women's desire for self-development, training, including that of subordinates, and communicative flexibility.

Conclusion. The stated objective of the study was achieved. This study experimentally examined gender differences in the management performance of managers at small and medium-sized enterprises.

The results of the experimental study confirmed the primary hypothesis: a gender balance in the behavioral characteristics of managers working in tandem is essential for high social management effectiveness, as measured by employee satisfaction.

Two additional hypotheses were also confirmed. First, the completeness of the management cycle in effective organizations is influenced by the varying degrees of managerial skills of male and female managers, provided these skills are complementary and mutually supportive. Thus, effective management requires a gender balance in managerial skills. Second, effectiveness is influenced by the gender balance in the behavioral characteristics of managers, determined by their different styles. These behavioral characteristics, in turn, are determined by the value orientations of managers, which also have gender differences.

The study addressed all the stated objectives:

- The current state of gender management and key research trends were examined. • An experimental study of company social performance and employee satisfaction was conducted.

- Gender differences in managerial skills necessary for implementing the full management cycle were identified, as assessed by employees and company managers' self-assessments.

- Gender preferences for management styles were examined, and their relationship with the level of managerial skills in male and female managers was determined.

- Gender differences in the motivation of managers based on value orientations were examined, and their relationship with managerial skills and management styles was determined.

The obtained results on gender differences were confirmed for statistical significance ($p \leq 0.01$; $p \leq 0.05$) using the Student's t-test and the Mann-Whitney U-test.

Based on the results of the experimental study, the following general conclusions were drawn.

1. Gender differences in managerial behavior were studied in the context of the factors that influence the social performance of organizations. Today, the competitiveness and development of companies are impossible without this type of performance, along with economic efficiency. Its main indicator and criterion is employee satisfaction with management.

2. Dominant conditions and factors of social effectiveness were identified: "Prospects," "Content of Work Performed," and "Management Style." Thus, employee satisfaction is influenced, firstly, by management in which the company's manager creates a clear understanding of the company's ultimate goal and development strategy, as well as expected results, thereby motivating them to achieve. Secondly, satisfaction is driven by work content that allows for variety through initiative and creativity. Thirdly, employee satisfaction is significantly influenced by the management style of managers as a way of organizing work and team interactions.

3. Management activity is considered as a management cycle, in which the implementation of each phase requires specific skills from the manager. Firstly, gender differences in the effectiveness of managers' management skills, as assessed by highly satisfied employees ($p \leq 0.01$), were established at a statistically significant level using the Student's t-test. Secondly, these skills are complementary, i.e., mutually supportive. Company effectiveness depends on the completeness of the management cycle, which is ensured by a gender balance of complementary management skills among male and female managers working in tandem.

4. Male managers are most successful in setting and communicating goals, as well as securing the resources necessary to achieve them. Their skills are expressed in strategic management, which requires the ability to analyze the organization's external environment—risks and threats—and develop actions to mitigate them for the organization's further development. Women, according to employees, are more successful in tactical management, demonstrating skills related to relationships, providing feedback, monitoring, delegating authority, and rewards. Unlike men, their skills are focused on the company's internal environment.

5. Employees' subjective assessments of gender differences in management confirmed the same gender balance found in managers' self-assessments of these same management skills. Statistical hypothesis testing, using the Mann-Whitney U-test, revealed significant differences ($p \leq 0.01$).

6. Gender balance in management styles is also an important factor in companies' social performance. It was found that male managers significantly prefer an authoritarian style, while women prefer a democratic style. Satisfaction with companies led by authoritarian male managers is explained by two factors. Firstly, their authority, which is based on strengths perceived by their subordinates: efficiency, focus on results, courage and willingness to take risks, decisiveness, openness to new ideas, and a willingness to find innovative solutions to achieve goals. Secondly, there is a gender balance in behavioral characteristics, driven by the different management styles of men and women. Differences in behavior manifest themselves at all stages of management: from goal setting and decision-making to monitoring and performance evaluation.

7. Gender differences in behavior, like management styles in general, are driven by the characteristics of the axiological sphere of the individual. It was found that female managers are predominantly motivated by the value orientations of "Management," "Lifestyle Integration," and "Job Security," while men are motivated by the orientations of "Challenge" and "Entrepreneurship." The complementarity established at this level is also evident in the fact that the priority value orientations in the women's hierarchy occupy insignificant ranks in the men's hierarchy, i.e., Their behavior is motivated by different values and needs. The statistical significance of gender differences was assessed using the Mann-Whitney U-test ($p \leq 0.05$).

8. Priority orientations and the values underlying them explain the behavioral characteristics of male managers: ambition, a preference for authoritarian management; motivation for success and a focus on results; fearlessness in the face of threats and risks; openness to new ideas and a desire to implement innovations.

9. The dominant value orientations of female managers indicate motivation by the need for preservation (stability) and security. At the behavioral level, this is manifested in a focus on professional self-improvement, learning from employees, as well as communicative flexibility, actions to support and preserve the company's internal environment through the organization of information flows, labor optimization, the creation of a psychological climate, ongoing monitoring, regular assessment of efforts to achieve goals (rewards), and employee motivation.

Based on the empirical results and conclusions, the following practical proposals are formulated.

Based on the research results, a model of gender-balanced management for educational organizations is proposed (Table 3).

Table 3 – Model of gender-balanced management for educational organizations

Model component	Content	Management tools	Expected result
Strategic block	Determination of the organization's development goal, analysis of the external environment	Strategic sessions, SWOT analysis, risk assessment	Clear direction of development, purposefulness
Tactical block	Organization of the internal pedagogical process, work with the team	Team building, feedback system, motivational meetings	Favorable psychological climate, collective agreement
Complementary coordination	Mutual replenishment of the skills of male and female managers	Regulations for joint decision-making, management pairs (tandem)	Full implementation of the management cycle
Monitoring	Sustainable assessment of social efficiency	Satisfaction surveys, internal audits	Sustainable development, increased efficiency

The presented gender-balanced management model is aimed at a harmonious combination of strategic and tactical management functions in educational organizations. The model is based on the complementary nature of the management skills of male and female leaders. While the strategic block allows for the organization's adaptation to the external environment and long-term development, the tactical block ensures internal stability, professional collaboration, and a favorable psychological climate within the teaching staff.

The complementary coordination component creates conditions for maintaining a gender balance in the management decision-making process, i.e., it ensures a balance between strategic goal setting and interpersonal relations regulation. And the monitoring system will allow for the constant assessment of the social performance of the organization and timely correction of management practices.

The implementation of this model contributes to the formation of a gender-pedagogical balanced management culture in educational organizations, increasing the level of employee satisfaction and ensuring the sustainable development of the organization.

The results of the study showed the need for a systematic development of gender-balanced leadership in educational organizations. In this regard, a special program is proposed that aims to harmoniously develop the management potential of male and female leaders. The goal of the program is to increase flexi-

bility in management styles, reduce the influence of gender stereotypes, and ensure a balanced implementation of strategic and tactical management functions.

The proposed "Gender-Balanced Leadership Development Program" is based on a modular structure and focuses on the comprehensive improvement of leadership skills. The program's content is outlined below (Figure 3).

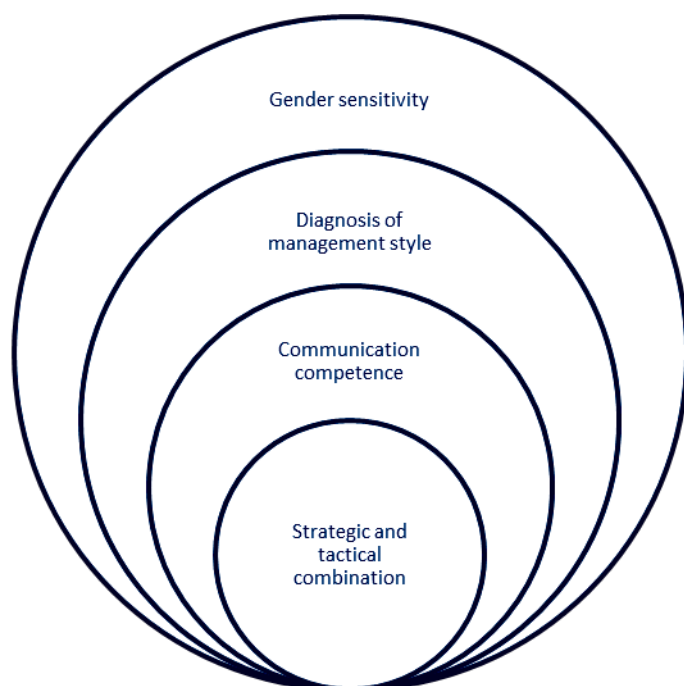


Figure 3 – Modules of the Gender and Pedagogical Leadership Development Program

The proposed program is aimed at the systematic formation of gender-pedagogical competence of managers in educational organizations. The phased implementation of the program will allow managers to consciously analyze their management style, identify its strengths and weaknesses, and determine the trajectory of professional development.

The gender sensitivity module helps to reduce the influence of hidden stereotypes in management and form a culture of balanced decision-making. The diagnosis of management style and the development of communicative competencies strengthen mutual trust between the supervisor and the teaching staff, and improve the quality of feedback. The strategic and tactical combination module is aimed at ensuring a balanced approach to the organization's external development and internal sustainability.

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ИНФОРМАТИКА МЕН БАҒДАРЛАМАЛАУДЫ ОҚЫТУДА БІЛІМ БЕРУ ОРТАСЫНДА МАНИПУЛЯТОРЛАР МЕН МИКРОКОНТРОЛЛЕРЛЕРДІ ҚОЛДАНУ

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Автоматтандыру мен цифрлық технологиялардың қарқынды дамуы жағдайында білім беру және өндірістік ортада робототехникалық жүйелерді әзірлеуге және қолдануға қабілетті мамандарды даярлау ерекше маңызға ие. Бұл мақалада компьютерлік технологиялар мен автоматтандырылған басқару тәсілдерін пайдалана отырып, Arduino микроконтроллері негізіндегі үш сатылы робот-манипуляторды жобалау, модельдеу және оны оқу процесіне енгізу тәжірибесі қарастырылады. Негізгі назар манипулятордың кинематикалық схемасын құруға, САД ортада 3D моделін әзірлеуге, қозғалыстың динамикалық талдауын жүргізуге, компоненттерді жобалап 3D басып шығару арқылы дайындауға, сондай-ақ компьютерден СОМ порты арқылы басқарылатын Arduino негізіндегі басқару жүйесін іске асыруға бағытталған. Зерттеу Л.Н. Гумилев атындағы Еуразия ұлттық университетінің Информатика кафедрасында бір оқу семестрінде жүргізіліп, «Информатика» білім беру бағдарламасының 2-курсынан 60 студент қатысты. Қатысушылар эксперименттік және бақылау топтарына бөлінді: эксперименттік топ манипуляторлар, сенсорлар және Arduino құрылғыларымен практикалық тренажерлерді қолданды. Нәтижелер эксперименттік топта қорытынды тест көрсеткішінің едәуір артқанын (78,4) және мотивация деңгейінің жоғарылағанын (4,4) көрсетті. Алынған деректер компьютерлік модельдеу мен тәжірибеге бағытталған робототехникалық оқыту теория мен практиканы тиімді интеграциялап, студенттердің алгоритмдік ойлауын, инженерлік құзыреттерін және пәнге қызығушылығын күшейтетінін дәлелдейді.

Түйінді сөздер: 3D, СОМ порты, серво жетектері, алгоритмдік ойлау, интеллектуалды жүйе, робототехника, Arduino.

ИСПОЛЬЗОВАНИЕ МАНИПУЛЯТОРОВ И МИКРОКОНТРОЛЛЕРОВ В ОБРАЗОВАТЕЛЬНОЙ СРЕДЕ ПРИ ОБУЧЕНИИ ИНФОРМАТИКЕ И ПРОГРАММИРОВАНИЮ

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В условиях стремительного развития автоматизации и цифровых технологий особое значение приобретает подготовка специалистов, способных разрабатывать и применять робототехнические системы в образовательной и производственной среде. В этой статье будет рассмотрен опыт проектирования, моделирования и внедрения в учебный процесс трехступенчатого робота-манипулятора на основе микроконтроллера Arduino с использованием компьютерных