PROBLEMS OF GENDER INEQUALITY IN THE SCIENTIFIC SPHERE OF THE ARCHITECTURAL AND CONSTRUCTION INDUSTRY

Abstract. The paper highlights the problem of gender inequality in science in different historical periods, shows the increasing role of women in research and educational activities in architecture and construction at the present stage, proves the ability of women to hold higher levels of academic hierarchy and research and administrative positions in Ukraine, as well as the competitiveness of women in the labor market in the architectural and construction industry.
**Keywords:** gender equality, institution of higher education, architectural and construction industry, education, science.

**Formulation of the problem.** Gender issues at different times have attracted the attention of society, which is confirmed by the large number of scientific papers on this topic both in Ukraine and in the world as a whole. Despite the large number of scientific publications devoted to the study of this issue, in modern Ukraine this issue remains uncertain, as most researchers are limited to historical reviews and generalizations of the situation in the world, and based on analysis of experimental data obtained by scientists from other countries. In addition, there are some contradictions between the experimental data obtained in different areas of activity.

That is why a detailed study of gender equality of students and teachers of higher education institutions of technical profile in Ukraine is a topical issue of the study.

**Analysis of recent research and publications.**

According to many scientists, in most historical periods women and men were in a situation of gender inequality, and women's access to scientific activity has changed significantly over time.

Thus, from the period of antiquity preserved information about the first woman engineer: En-Hedu-Anna, who lived in ancient Egypt around 2350 BC. In ancient Greece, among the members of the school of Pythagoras (about 530 BC), there were about 30 women, but outside it, women did not have access to education.

The most famous scientist of the time was Theania, whose work includes treatises on mathematics and medicine that have survived to our time, and after the death of Pythagoras, she, in general, headed this scientific school. In Plato's scientific academy (387 BC), women had to hide their gender by changing into men's clothing. Axiopeia, who was one of the students of the academy and studied natural philosophy, realized herself in mechanics [1, p. 103].

However, during the Middle Ages in Europe, women's access to science was very limited. The first to raise the issue of equal rights for women and men was the French writer Christina of Pisa. In her short story "Le Livre de la Cité des Dames"
(1405), the author notes: of all sciences and arts as well as the sons. But ... it happened to women that being weaker and more delicate in stature than men, they were less able to perform many duties, and therefore their minds are wider and more perceptive than they can show " [1, p. 104; 2, p. 231].

At the end of the Middle Ages, the prestige of education rises and at the same time increased restrictions on women's access to it. In the research of I. Bogdanova (2004) the tendency of that period to become the most outstanding women scientists of ladies from aristocratic families was revealed. The most prominent among them were Anna Conway and Lady Mary Montague.

In those days, ordinary women did not officially have the opportunity to receive secular education, they only received knowledge from their fathers, brothers, husbands, and often worked together in scientific laboratories [1, p. 104-105].

In the seventeenth and eighteenth centuries this trend has not changed. Despite the fact that educated women took an active part in the creation of some scientific organizations and communities (because the idea of creating the French Academy in 1635 was imposed on its founder Richelieu Madame Rambouillet, and Prussian Queen Sophie Charlotte, a student of Leibniz, contributed to the creation of Berlin Academy of Sciences in 1700) women still did not have direct free access to scientific activities during this period. Women gained access to study at European universities on an equal footing with men only in the 1860s. [1, p. 106].

According to research by O. Mavrina and O. Mykhailyuk (2012), who studied women's access to education in the 1920s and 1930s in the Union of Soviet Socialist Republics (USSR), women were given the opportunity to study at universities on a par with men only in the late nineteenth.

In modern Ukraine, this became possible only after the Soviet government proclaimed equality between women and men and signed certain legislative acts in the 1920s. All this gave women the opportunity not only to study in high school, but also to freely choose a profession.

The establishment of the Ukrainian Academy of Sciences also contributed to the growing popularity of scientific activity among women who, despite gender inequality, made a significant contribution to the development of science in the...
Ukrainian Soviet Socialist Republics (SSR). P. M. Vasylivna (paleozoologist) became the first woman scientist to become a full member of the All-Ukrainian Academy of Sciences (AUAS).

The first woman in Ukraine − Candidate of Physical and Mathematical Sciences K. Ya. Lyatysheva is the author of about forty works in physics and mathematics. One of the best specialists in the field of non-metallic crystal physics was a Ukrainian physicist − A. F. Prykhotko [3, p. 237-238]. The list of the first male AUAS academics includes historians D. Bagaley and O. Levitsky, economist M. Tugan-Baranovsky, philologist M. Petrov, biologist M. Kashchenko and mechanic S. Tymoshenko.

O. Zernetska and O. Myronchuk (2008), studying the position of women in the scientific sphere at the turn of the XX-XXI centuries. note that Ukraine in the gender issue is moving in line with the trends observed in the United States of America and the European Union. In these countries, women succeed only in lower academic degrees (bachelor's and master's), but lag behind men at higher levels of the academic hierarchy and in scientific and administrative positions. According to the authors, a similar situation is also observed in wages [4, p. 120, 126].

According to a study by O. Zernetska and O. Myronchuk (2008), as of 2008 "out of 777 Nobel Prize winners (all categories: physics, chemistry, physiology, medicine, literature and the Peace Prize)" only 34 women [4, p. 117].

L. M. Ogorodnik (2011), tracking the gender composition of scientists of various degrees and corresponding members and academics of the National Academy of Sciences of Ukraine (NASU) in the mid-90s of the last century states that among candidates of science, women make up 32 %, among doctors of science − 14 %, and among NASU correspondents and academics − only 4 %.

According to the author, the main problems of gender inequality among scientists in Ukraine are conservative stereotypes about the role of women in social processes, and the difficulty of combining scientific activities with maternal responsibilities. This problem causes another − women are much less likely to use training opportunities, which significantly reduces their competitiveness compared to men in the Labour market [5, p. 253].
The same aspect, but for a purely construction industry, was explored by Valerie Francis (2017), who examined the individual, interpersonal and organizational factors of gender equality with 456 women professionals and identified a number of factors influencing their career advancement. The researcher found that it is individual factors that have the greatest impact on women's career growth. This finding points to a competitive rather than a "sponsorship" path of professional growth, while promotion processes have potential gender bias, and organizational support, social media and mentoring do not help a woman in her career, but are an important deterrent to completion of women's professional activities in the field of construction [6, p. 271-272].

According to M. Savitsky, G. Yevseeva, V. Babenko, S. Volkova and G. Lysenko (2021), who studied the general ratio of men and women among research and teaching staff Prydniprovska State Academy of Civil Engineering and Architecture (PSACEA) during the second half of the twentieth century, in 1953 the institution taught 44% of women, in 1974 only 26%, and in 2005 − 43% of women [7, p. 122].

The meticulous attitude towards women scientists over several historical periods encourages a detailed study of gender equality in the scientific and educational activities of the architectural and construction industry at the present stage.

**Object of research:** problems of gender inequality in educational and scientific spheres.

**Subject of research:** gender equality in the institution of higher education of architectural and construction profile.

**The purpose of the study:** to investigate the problem of gender equality in the institution of higher education of architectural and construction profile.

**Objectives of the study:**

1. To study and summarize knowledge and experience on the problem of gender inequality in science and consider the possibility of professional growth of women in science in different historical periods.

2. Investigate gender equality among students and teachers of the Dnieper State Academy of Civil Engineering and Architecture.
3. Analyze gender equality in pay and the opportunity to hold leadership positions in the scientific and educational field of architecture and construction in the example of PSACEA.

**Research results.**

Analysis of recent research has shown that in previous historical periods, the representatives of the scientific sphere were mostly men, and until the early twentieth century, women, despite their significant contribution to scientific activity, were an exception among scientists [1-5, 8]. According to many researchers, in today's Ukraine the "statistical" trend is little different from neighbouring countries, where the ratio of men and women in different professions has not changed in recent years, but the share of women in leadership positions in Ukraine is growing rather slowly. society's perception of gender equality [6, 7, 9].

In this paper, gender aspects are considered based on the gender specified in the passport. The study analyzed data from 232 research and teaching staff and 2214 PSACEA students as of the 2020-21 academic year.

An analysis of the ratio of men to women with scientific or senior positions in PSACEA showed that, although the architectural and construction industry is considered a priority for men, among PSACEA research and teaching staff, men do not have a significant quantitative advantage (52 % of men to 48 % of women). In some PSACEA faculties, on the other hand, there are more women at the highest level of the academic hierarchy (Tables 1). Thus, at the Faculty of Economics and at the Educational and Scientific Institute of Innovative Educational Technologies (ESIIET), the number of such women is 76 % and 74 %, respectively, and at the faculties of engineering, men predominate by 10, maximum 20 %.

For comparison, the overall ratio of research and teaching staff of PSACEA at the beginning of 2021 according to M. Savitsky, G. Evseeva, V. Babenko, S. Volkova and G. Lysenko (2021) is 46 % men to 53 % women [7, p. 122].

The analysis of the ratio of men and women – PSACEA research and teaching staff, who were awarded academic titles and degrees in 2020 (Fig. 1), also did not set limits on women's opportunities, as academic titles of professors and academic degrees of candidates and candidates. Men and women received equal doctorates in
equal proportions, and 64% of women received the title of associate professor compared to 36% of men.

**Table 1**

<table>
<thead>
<tr>
<th>Faculties</th>
<th>Indicator</th>
<th>Have a degree</th>
<th>They have an academic title</th>
<th>Occupy positions</th>
<th>Correlation by faculties PSACEA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Candid. Sc.</td>
<td>Doctor of Science</td>
<td>Assoc. Prof.</td>
<td>Professor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>m</td>
<td>w</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td>total</td>
<td>22</td>
<td>1</td>
<td>21</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>quantity (%)</td>
<td>16</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>ratio (%)</td>
<td>73</td>
<td>27</td>
<td>100</td>
<td>0</td>
<td>62</td>
</tr>
</tbody>
</table>

| total           | 39        | 8 | 39 | 7 | 1 | 2 | 5 | 100 |

| quantity (as of the 2020-21 academic year): “m” – Mens; “w” – Women. |

Fig. 1. The ratio of men and women among the scientific and pedagogical workers of PSACEA, who were awarded degrees and academic titles in 2020 (based on the decisions of the Certification Board of the Ministry of Education and Science of Ukraine)
When comparing the quantitative ratio of boys and girls among PSACEA masters (Table 2), it was stated that 61\% of boys choose the master's degree in entrepreneurship compared to 39\% of girls, and 59\% of boys choose the master's degree in science versus 41\% of girls, which is directly related to the overall ratio of students in the full-time department of PSACEA (60\% of boys to 40\% of girls).

For comparison, the overall ratio of boys and girls among PSACEA students at the beginning of 2021, according to M. Savitsky, G. Yevseeva, V. Babenko, S. Volkova and G. Lysenko (2021), is 58\% of boys to 43\% of girls [7, p. 122].

### Table 2

**Quantitative ratio of boys and girls among full-time masters of PSACEA**

<table>
<thead>
<tr>
<th>Course</th>
<th>Indicator</th>
<th>Faculties</th>
<th>Correlation by faculties</th>
<th>PSACEA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Architecture</td>
<td>Economics</td>
<td>Cons. and C.E.</td>
</tr>
<tr>
<td>Masters entrepreneurs</td>
<td>sex</td>
<td>b</td>
<td>g</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td>quantity</td>
<td>19</td>
<td>68</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>87</td>
<td>93</td>
<td>127</td>
</tr>
<tr>
<td>Masters scientists</td>
<td>ratio (%)</td>
<td>61</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>quantity</td>
<td>17</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General statistics</td>
<td>ratio (%)</td>
<td>59</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>full-time students</td>
<td>quantity</td>
<td>217</td>
<td>356</td>
<td>193</td>
</tr>
<tr>
<td></td>
<td>total</td>
<td>573</td>
<td>406</td>
<td>630</td>
</tr>
<tr>
<td>Correlation by faculties</td>
<td>25.9%</td>
<td>18.3%</td>
<td>28.5%</td>
<td>13.5%</td>
</tr>
</tbody>
</table>

* - as of the 2020-21 academic year: "b" – Boys; "g" – Girls.

In addition, during the study it was stated that the size of salaries and allowances of research and teaching staff of PSACEA (Table 3) has no effect on the sex of the employee.

### Table 3

**Salaries and allowances of scientific and pedagogical staff of PSACEA**

<table>
<thead>
<tr>
<th>Salaries</th>
<th>Salary (UAH)</th>
<th>Types of allowances</th>
<th>The amount of the allowance (as a percentage of salary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>position</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dean</td>
<td>10028**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head department</td>
<td>9508**</td>
<td>- for a degree</td>
<td>Cand. Sc. – 15%**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Doctors of Science – 25%**</td>
</tr>
</tbody>
</table>
Data on women's ability to hold managerial positions in the field of architecture and construction and salaries regardless of gender are inconsistent with data obtained by other researchers on women's competitiveness in the Labour market [4, 5, 6].

The peculiarity of production processes in the architectural and construction industry is that in the practice of civil engineering and architectural design, specialists solve quite different tasks, but it always happens collectively. There is room for both women and men in the project teams. Among the contractors, developers (work is painstaking, requires attention and the ability to coordinate many factors), both men and women have been working for many years, sometimes even more women.

But it is men who predominate among project managers, which is explained by the specifics of the negotiation and technological processes of "design-approval-construction", which is partly explained by the traditions of relations between the sexes in the workplace.

In addition, over the past two decades, there have been many more interiors, landscaping, and private architectural design, with women architects working on an equal footing with men.

Thus, in the course of this study, the data of M. Savitsky, G. Yevseyeva, V. Babenko, S. Volkova and G. Lysenko (2021) regarding the gender portrait of PSACEA were confirmed [7, p. 122], supplemented the study of O. Chelnokov, S. Solohubova, I. Shvets, D. Girkina, V. Holubieva (2021), on equal opportunities for young men and women – students of PSACEA to receive an academic scholarship [8, p. 128-129]; and V. Francis (2017) research on the potential of women in the field of architecture and construction [6, p. 271-272], as well as refuted the data of O. Zernetska and O. Myronchuk (2008) on the limited
opportunities for women to occupy higher levels of academic hierarchy and scientific-administrative positions [4, p. 120-126] and data of L. Ogorodnik (2011) on the desire of women to improve in the professional sphere and improve their skills [5, p. 253].

Conclusions.

1. An analysis of recent publications has shown that in previous historical periods, mostly men were engaged in science, and women gained equal access to scientific activity only at the turn of the nineteenth and twentieth century's.

2. The study proved the ability of women to hold higher levels of academic hierarchy and research and administrative positions in Ukraine, as well as the competitiveness of women in the Labour market in the architectural and construction industry.

3. The study shows the increasing role of women in research and educational activities in the field of architecture and construction at the present stage and helps to increase self-esteem and self-confidence of adolescent girls who choose architectural and construction specialties.

References:

4. Зернецька, О. В.; Мирончук, О. А. (2008) Гендерна політика у сфері академічної науки [Zernetska, OV; Myronchuk, O. A. Gender policy in the field of academic science]. Політичний менеджмент. № 5. 116-127.
5. Огородник, Л. М. (2011) Гендерні дослідження: місце українських жінок в освіті та науці [Ogorodenik, L. M. Gender research: the place of Ukrainian women in education and
Science]. Педагогічний дискурс. № 9. 251-254.
8. Челноков, О. В.; Сологубова, С. В.; Швець, І. А.; Гіркіна, Д. Д.; Голубєва, В. А. (2021) Гендерна трансформація освіти в архітектурно-будівельній галузі [Chelnokov, O.; Solohubova, S.; Shvets, I.; Girkina, D., Holubieva, V. Gender transformation of education in the field of architecture and construction]. Український журнал будівництва та архітектури. № 2 (002). 122-130. DOI: 10.30838/J.BPSACEA.2312.270421.122.759