The paper deals with the necessity to apply a competence-based approach in the process of future civil defense specialists’ training. The aim of the research is to examine the levels of manifestation of future civil defense specialists’ professional competence components. The following professional competence components have been specified: communicative, informational and socio-legal. The following levels of the above mentioned competences maturity have been distinguished: low, medium, sufficient, and high. The levels of the respondents’ competences maturity have been examined by means of Wilcoxon Signed Rank Test. The results of the conducted research prove the necessity for improving the levels of communicative, informational and socio-legal components of the future civil defense specialists’ professional competence.

Keywords: higher education, competence-based approach, professional competence, professional competence components, civil defense specialists.

Introduction
The current stage of higher education development is characterized by the process of modernization which means refocusing of the future specialists from the reproductive level of knowledge acquisition to the competence formation level. The prominent idea of higher education is a competence-based approach. Researchers believe that it is this approach that can tackle current challenges providing high quality of studying [3, p. 179].

The competence-based approach shifts the aim and the vector of higher education from imparting knowledge and skills of the subjects’ content to the development of a

Submitted on June, 1, 2017
The implementation of the competence-based approach in the future civil defense specialists’ training process will provide intensification of student-centered approach in teaching; an optimal combination of student-centered and activity approaches; increase in the significance of the technologies and methods which are aimed at the formation of practical skills in data search and analysis.


A number of Ukrainian and foreign researchers’ studies are dedicated to the competence-based pattern of specialists’ training in higher educational institutions. For example, O. Kuchai [4] describes competence as a result characteristics of education; K. Pasynchuk [5] studies the essence of the future civil defense specialists’ professional competency; I. Drach [2], O. Savchenko [6] explore conceptual bases of keeping to the competence-based approach in education; O. Subetto [8] explores the ontology and epistemology of the competence-based approach; T. Tkachenko [9] worked out organizational-pedagogical conditions of the formation of cadets’ professional competency by means of ICT; A. Hrypunova [10] studied the formation of the future civil defense engineers’ ecological competence.

When determining competence qualification criteria O. Sliusarenko proves that “competence-based approach is a complex of general conditions determining logics of the educational process focused on the development of the unity of accomplishments and awareness, skills, conceptual orientation, adaptive possibilities, experience and work methods in terms of achieving a certain aim” [7, p. 294].

Studying papers on the issue, we have not found any researches specifying components and determining levels of professional competence of future civil defense specialists, which proves rationality of their consideration.

The paper aims to study the levels of manifestation of future civil defense specialists’ professional competence components.

Research methods: scientific literature analysis with the aim of determining and theoretical justification of the issue of future civil defense specialists’ professional competence components; synthesis, generalization, classification; statistical methods (Wilcoxon Signed Rank Test, Student’s t-test); graphical – for the generalization and presentation of the results outcomes.

Discussion

The system of future civil defense specialists’ professional training includes a process of acquisition of knowledge and skills to be mastered and used in the future work. The potential of the competence-based approach can be proved by the fact that it makes a cadet competent for performing his/her occupational duties at work; contributes to shifting focus from accumulation of knowledge and skills to the formation and development of the future specialists’ ability to act.

The implementation of the competence-based approach helps transform goals and content of education into subjective acquisitions of a future specialist (in our case, a civil defense specialist) which can be measured objectively. Thus, the main aim of the competence-based approach is to create conditions for self-organization of a future specialist and his/her activity.

The determination of key competences corresponds to the fundamental goals of education as summarized in UNESCO documents: to teach students acquire knowledge (to teach to study); to teach to work and earn (studying for work); to teach to live (studying for life); to teach to live together (studying for relationship).

The governmental strategy of modernization of education implies that “key competences” will be the cornerstone of the renovated content of general education. It is presupposed that key competences, which are being formed or developed, must include communicative, informational and socio-legal components.

We have distinguished four levels of future civil defense specialists’ professional competence components.

Low level: a cadet has theoretical knowledge to a limited extent, can reproduce it mechanically at the level of certain facts without their interconnection; he/she cannot independently determine the goal and objectives of work from the point of view of legislative provisions. He/she can hardly understand the necessity and has no desire to interact as a specialist in the sphere of civil defense with people; has no worldview universals in keeping to the legislative base of the civil defense specialist’s activity; has no motivation for professional competence enhancement.

Medium level: a cadet has theoretical knowledge at the introductory level; he/she can hardly define terms and notions, seldom uses them in work; tries to determine the goal and objectives of communicative activity from the point of view of legislative provisions but it is mostly the imitation that dominates in determining goals and objectives of work. A cadet can apply his/her knowledge, although sometimes there appear difficulties, which lead to wrong expert conclusions; he/she lacks value orientations in professional activity while keeping to the legislative base in the civil defense specialist’s activity; he/she has external motivation of professional competence enhancement.
Sufficient level: a cadet independently reproduces legal knowledge at the level of understanding emergencies; tackles typical tasks; understands the need to keep to the legislative base in his/her work; his/her desire to work as a speaker in the sphere of civil defense is combined with the anticipation of solving problems by others; he/she has a positive attitude towards work from the standpoint of legislation, unstable situational motivation of professional competence enhancement.

High level: a cadet has systemic knowledge, applies it fully understanding the logics of its application; shows initiative and independence in communicative activity; is fast and flawless at using information; is aware of the necessity of work from the perspective of the speaker in the sphere of civil defense of population; keeps to the legislative provisions of the civil defense specialist’ activity when performing theoretical and practical tasks; has positive attitude to the future work from the standpoint of legislative provisions; has positive motivation of professional competence enhancement.

Social significance and practical need of the formation of the future civil defense specialists’ professional competence, insufficient theoretical and practical status of the given issue prove the necessity of researching levels of their professional competence maturity on the grounds of the determined components. For this purpose, there were chosen a control group (CG) and an experimental group (EG).

The testing of the researched groups’ qualitative homogeneity was carried out using Wilcoxon Signed Rank Test [1, p. 247]. Critical values of this test are calculated for the significance test level \( \alpha = 0.05 \), and sample sizes \( n_1 = 205 \), \( n_2 = 208 \) (the first one is a sample of a smaller size) (table 1).

### Table 1.

| Critical values of Wilcoxon Signed Rank Test  
\( (\alpha = 0.05) \) | \( n_1 = 205 \), \( n_2 = 208 \) | \( n_1 = n_2 = 205 \) | \( n_1 = n_2 = 208 \) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>lower critical values</td>
<td>40057</td>
<td>39775</td>
<td>40964</td>
</tr>
<tr>
<td>upper critical values</td>
<td>44813</td>
<td>44480</td>
<td>45772</td>
</tr>
</tbody>
</table>

### Communicative Component

#### Table 2.

| Levels of Communicative Component Maturity  
in CG and EG  
( empirical distribution ) | low | medium | sufficient | high |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Number of participants</td>
<td>CG(( x )) ( n_1 = 205 )</td>
<td>51</td>
<td>101</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>EG(( y )) ( n_2 = 208 )</td>
<td>54</td>
<td>104</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>105</td>
<td>310</td>
<td>413</td>
<td>413</td>
</tr>
</tbody>
</table>

A) Homogeneity
1) general static series:  
   1 \ldots 105 106 \ldots 310 311 \ldots 413;  
2) empirical values of the test: \( w_{\text{emp}} = 42897 \).  
This value does not fall outside the critical area. Samples are qualitatively homogenous.

B) Quantitative characters
1) CG (\( x \)): \( \bar{x} = 5.02; S_x^2 = 2.0388; \ S_x = 1.43 \);  
2) EG (\( y \)): \( \bar{y} = 4.96; S_y^2 = 2.0082; \ S_y = 1.42 \).

C) Contrast of means
1) empirical value of Student’s t-test:  
   \[ T_{\text{emp}} = \frac{5.02 - 4.96}{\sqrt{204 \cdot 2.0388 + 207 \cdot 2.0082}} \cdot 206 = 0.43 \]  
2) empirical value of the test: \( t_{\alpha} = 1.96 \).  
   \( T_{\text{emp}} < t_{\alpha} \). Contrast of means differs slightly.
According to the results, cadets did not have high level of communicative component maturity. The sufficient level of communicative component maturity was found in 24.9% of cadets, among which 51.8% – in CG and 48.2% – EG.

The medium level of communicative component maturity is peculiar for 49.6% of cadets, among which 49.7% in CG and 50.3% in EG.

The low level of communicative component maturity was found at this stage in 25.4% of cadets, among which 48.9% are CG representatives and 51.1% – EG representatives.

According to the communicative component maturity, the researched groups were found to be qualitatively homogenous and their quantitative characteristics did not differ significantly.

**Informational Component**

Table 3.

<table>
<thead>
<tr>
<th>Number of participants</th>
<th>Grades</th>
<th>low</th>
<th>medium</th>
<th>sufficient</th>
<th>high</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG (x) (n = 205)</td>
<td>3</td>
<td>55</td>
<td>103</td>
<td>47</td>
<td>0</td>
</tr>
<tr>
<td>EG (y) (n = 208)</td>
<td>3</td>
<td>60</td>
<td>104</td>
<td>44</td>
<td>0</td>
</tr>
</tbody>
</table>

A) Homogeneity
1) general static series:
   1 ... 115 116 ... 322 323 ... 413;
2) empirical value of the test: \(w_{emp.} = 43043\). This value does not fall outside the critical area. Samples are qualitatively homogenous.

B) Quantitative characters
1) CG (x): \(\bar{x} = 4.92\); \(S_x^2 = 1.9842\); \(S_x = 1.41\);
2) EG (y): \(\bar{y} = 4.84\); \(S_y^2 = 1.9764\); \(S_y = 1.40\).

C) Contrast of means
1) empirical value of Student’s t-test:
\[
T_{emp.} = \frac{4.92 - 4.84}{\sqrt{204 \cdot 1.9842 + 207 \cdot 1.9764}} \cdot 206 = 0.58
\]
2) empirical value of the test: \(t_{cr} = 1.96\).

\(T_{emp.} < t_{cr}\). Contrast of means differs slightly.
Fig. 2. Levels of Informational Component Maturity in CG and EG

Unfortunately, the cadets did not have high level of informational component maturity.

The sufficient level of informational component maturity was found in 22.0% of cadets, among which 51.9% are from CG and 48.1% – EG.

The medium level of the above-mentioned component was found in 50.1% of cadets, among which 50.1% in CG and 49.9% in EG.

The low level of informational component maturity was found in 27.9% of cadets, among which 48.3% – CG representatives, a 51.7% – EG representatives.

According to the informational component maturity, the researched groups were found to be qualitatively homogenous and their quantitative characteristics did not differ significantly.

Socio-Legal Component

Table 4.

<table>
<thead>
<tr>
<th>Levels of CG and EG Socio-legal Component Maturity</th>
<th>low</th>
<th>medium</th>
<th>sufficient</th>
<th>high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>CG(χ) (n_c = 205)</td>
<td>64</td>
<td>96</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>EG(γ) (n_c = 208)</td>
<td>67</td>
<td>98</td>
<td>43</td>
<td>0</td>
</tr>
<tr>
<td>Number of participants</td>
<td>131</td>
<td>194</td>
<td>88</td>
<td>0</td>
</tr>
<tr>
<td>131</td>
<td>325</td>
<td>413</td>
<td>413</td>
<td></td>
</tr>
</tbody>
</table>

A) Homogeneity

1) general static series:

1 ... 131 132 ... 325 326 ... 413;

2) empirical value of the test: This value does not fall outside the critical area. Samples are qualitatively homogenous.

B) Quantitative characters

1) CG (χ): \( \bar{x} = 4.81; S_x^2 = 2.1027; S_x = 1.45 \);

2) EG (γ): \( \bar{y} = 4.76; S_y^2 = 2.0722; S_y = 1.44 \).

C) Contrast of means

1) empirical value of Student’s t-test:

\[
T_{emp.} = \frac{4.81 - 4.76}{\sqrt{204 \cdot 2.1027 + 207 \cdot 2.0722}} \cdot 206 = 0.35
\]

2) empirical value of the test: \( t_{\alpha} = 1.96 \).

\( T_{emp.} < t_{\alpha} \). Contrast of means differs slightly.
Apparently, cadets did not have high level of socio-
legal component maturity.

The sufficient level of maturity of the above-
mentioned component was found in 21.3% of cadets, among which 51.5% in CG, 48.5% – EG.

The medium level was found in 47.0% of cadets, among which 49.8% – in CG and 50.2% – EG.

The low level of socio-legal component maturity was found in 31.7% of cadets, among which 49.2% are CG representatives, and 50.8% – EG representatives.

According to the socio-legal component maturity, the researched groups were found to be qualitatively homogenous while their quantitative characteristics did not differ significantly.

Conclusions

The results of the conducted research prove the neces-
sity to enhance the levels of the future civil defense spe-
cialists’ professional competence components maturity (communicative, informational and socio-legal).

The conducted research work does not touch upon all the aspects of the studied issue. Further research studies require a workout of organizational and pedagogical conditions for the future civil defense specialists’ professional competence formation, their implementation and coverage of results of the formative experiment.

REFERENCES


Science and Education, 2017, Issue 6 —— 117
ДОСЛІДЖЕННЯ РІВНІВ ПРОЯВУ КОМПОНЕНТІВ ПРОФЕСІЙНОЇ КОМПЕТЕНТНОСТІ МАЙБУТНІХ ФАХІВЦІВ ЦІВІЛЬНОГО ЗАХИСТУ

Мета статті полягала в дослідженні рівнів прояву компонентів професійної компетентності майбутніх фахівців цивільного захисту. Завдання статті передбачало визначення компонентів професійної компетентності майбутніх фахівців цивільного захисту та дослідження рівнів їхньої сформованості. У ході дослідження використано методи дослідження: аналіз наукової літератури з метою визначення й теоретичного обґрунтування проблеми формування професійної компетентності майбутніх фахівців цивільного захисту; синтез, узагальнення, систематизація для теоретичного обґрунтування компонентів професійної компетентності майбутніх фахівців цивільного захисту; статистичні методи для оцінювання отриманих даних і встановлення кількісної залежності між досліджуваними явищами та процесами; графічні – для узагальнення та представлення результатів дослідження. Автором доведено необхідність досягнення результатів підготовки майбутніх фахівців цивільного захисту. Результати проведеного дослідження доводять необхідність підвищення рівня прояву комунікативного, інформаційного та соціально-правового компонентів професійної компетентності майбутніх фахівців цивільного захисту.

Ключові слова: вища освіта, компетентнісний підхід, професійна компетентність, компоненти професійної компетентності, фахівць цивільного захисту.

Submitted on June, 1, 2017