Features of perfectionism among future environmental engineers

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Abstract. The purpose of the study is to analyze students’ high demands on themselves and others; the desire to achieve sophistication in everything (especially in work) – perfectionism. Two methods of research were used: theoretical analysis and diagnostic tests: "The Multidimensional Perfectionism Scale" by P. Hewitt and G. Flatt, one for determining the level of self-efficacy by M. Scheer and J. Maddux in the adaptation of A. V. Boyarintseva, the methodology "Differential test of perfectionism by A.A. Zolotareva". The students of Sevastopol State University took part in the surveys. The empirical study involved 30 people (students – future environmental engineers). When studying the features of perfectionism, according to the results of the methodology «Multidimensional scale of perfectionism», the levels of perfectionism were equally distributed, namely, half of the sample had low indicators of perfectionism, and the other half had average ones. The results according to the method of A. Zolotareva aimed at studying perfectionism among students show that most of the respondents have a normal type of perfectionism, that is, such students tend to strive for excellence without conflict with other motives. A relationship between personal maturity and perfectionism among students was identified by means of the Pearson correlation coefficient. Recommendations for increasing the level of perfectionism to a constructive one were given due to theoretical analysis and empirical study of the problem of personal maturity and perfectionism among students. In conclusion the authors consider the training program as an integrative personal education, consisting of researching indicators: personal, cognitive-activity, and social components.

1 Introduction

The modern world of the XXI century is characterized by the dynamic development of social, economic, political aspects, and the personality is an integral part of one. A great number of new requirements are put forward to a person, certain qualities and traits that contribute to one’s successful functioning in a society. It is a person who must be diversified and harmoniously developed, contribute to the formation of innovations and the implementation of achievements in life, be able to adapt to...
The fundamental theoretical basis for the study of personal maturity in our work was the work of domestic scientists B.G. Ananiev, L.S. Vygotsky, V.V. Davydov, P.F. Kapterev, A.N. Fromm, E. Erickson and others. However, on the way to self-realization, many people face barriers and obstacles to such achievements, one of which is a psychological phenomenon – personal perfectionism, when students set unattainable goals and unrealistic plans for themselves.

The phenomenon of perfectionism first attracted attention both among psychologists-researchers and practitioners due to its ambiguous effect on human activity and emotional status. The first studies began in the 1980s.

“The perfectionism was considered as a personality style characterized by negative aspects like striving to be perfect, self-criticism and also low self-esteem and depression. But the last decade’s research drew up perfectionism as a multidimensional construct which imply personal and social elements, with both positive and negative effects onto performance and development” [3, p. 2].

Goetz, Titz, Pekrun, and Perry indicate that students are experiencing a diversity of emotions in various academic contexts.

2 Materials and methods

The objective of the study is to analyze students’ high demands on themselves and others; the desire to achieve sophistication in everything (especially in work) – perfectionism. The following tasks of our study are:

1. To conduct a theoretical analysis on the problem of perfectionism and personal maturity among students – future environmental engineers.
2. To conduct an empirical study and identify the relationship between personal maturity and perfectionism among students.
3. To develop a training program for the formation of personal maturity among future environmental engineers through a decrease in the overall level of perfectionism to a constructive one.

Two methods of research were used: theoretical analysis and diagnostic tests: "The Multidimensional Perfectionism Scale" by P. Hewitt and G. Flatt [5, 6], the test for determining the level of self-efficacy by M. Scheer and J. Maddux [7], and the methodology "Differential test of perfectionism by A.A. Zolotareva" [8].

V. Curelaru, G. Diac, D. Muntele Hendreș state that the perfectionism was studied in the educational field in relation to academic performance, motivation, and achievement goals. But there are just a small number of studies that analyzed the perfectionism in relation to positive emotions in educational settings [3, p. 2].

Perfectionism in high school students, academic emotions, real and perceived academic achievement were studied by K.G. Rice, C. M.E. Richardson, and M.E. Ray [9]. R. Pekrun, T. Goetz, W. Titz, R.P. Perry wrote about academic emotions in students’ self regulated learning and achievement [4].

And yet the question of the influence of perfectionism on students – future environmental engineers remains open.

Experimental base: the study was conducted at the Sevastopol State University of city of Sevastopol.

Sample: 1-2 year students of Sevastopol State University took part in the study. The empirical study involved 30 people (students – future environmental engineers) aged 18 to 20 years: 15 boys and 15 girls from the entire sample of subjects.
3 Results

An environmental engineer is vital as it is he or she who “applies engineering principles and scientific knowledge to address environmental challenges and promote sustainable development” [10]. Environmental engineers work to minimize pollution, protect the environment, and ensure the efficient use of resources. They also play a role in air quality management, working on reducing emissions from industrial processes, designing air pollution control systems, or analyzing the effects of air pollutants on human health.

Environmental engineers apply understanding of environmental systems to develop strategies to protect environmental and human health. Graduates are prepared to solve the problem of the quality of life that’s why they should be highly motivated to achieve the best results in order to “contributed greatly to the progress of the agenda” [11, p. 23].

The concept of “perfectionism” is a multi-dimensional phenomenon, its various forms can both activate activities aimed at achieving high results, and have a negative impact, causing, for example, emotional overstrain in a person.

From a philosophical point of view, the desire for self-improvement is the main goal of the meaning of a person’s life [12]. Thus, the following definitions of this phenomenon are given in philosophical dictionaries: “Perfectionism (lat. Perfectus – perfection) is a system of value orientations that indicates the presence of some absolutely positive moral model, the desire to approach which should be the meaning of human life” [8, p. 24]; “Perfectionism is the belief that the improvement of both oneself and others is the goal that a person should strive for” [8, p. 23]. According to the teachings of Aristotle, a perfect person is one who is virtuous, engages in favorite activities, knows the measure in everything and strives for a worthy and beautiful life. And self-improvement contributes to the happiness of the individual.

The ideas of perfectionism are present in the concepts of Renaissance thinkers, including Fr. Nietzsche with his idea of the Superman. The philosopher argued that it is possible to become a superman by overcoming internal slavery, which will help to reach a new level of development. That is, this is such a person who is constantly improving, thereby taking responsibility for one’s weaknesses, training, mind, emotions, knows how to control oneself and is not subject to destructive motivations [3].

It is also important to mention a number of studies in which perfectionism is considered as a personality trait inherent in gifted people (K. Dabrowski, L. Danilevich, V. Rodel, L. Silverman). Representatives of this approach do not exclude the fact that anxiety can become a problem of realization of perfectionist abilities. Perfectionist tendencies direct a person to search for a life goal that frees the person from the restrictions imposed by social stereotypes, as well as excessive anxiety [3].

In our work, we consider the concept of perfectionism from the perspective of constructive and destructive phenomenon. Where in the first case, perfectionism activates activities aimed at achieving high results, and in the other case it has a negative impact, causing emotional overstrain in a person (table 1).

<table>
<thead>
<tr>
<th>Constructive</th>
<th>Destructive</th>
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<tbody>
<tr>
<td>Perfectionism activates activities aimed at achieving high results</td>
<td>Perfectionism has a negative impact, causing person’s emotional overstrain</td>
</tr>
<tr>
<td>Constructive perfectionists are able to formulate achievable goals and adjust them depending on the situation, while allowing</td>
<td>Destructive perfectionists are characterized by low high standards and polarized thinking, which is limited to two opposite</td>
</tr>
</tbody>
</table>

Table 1.
for the possibility of both success and failure, but maintain a very high level of optimism and positive thinking, demonstrating a desire for self-development.

They are characterized by a high level of standards and low polarization of thought. The absence of a categorical assessment of one's activities contributes to high self-esteem and tolerance, and a developed desire for high standards makes representatives of this type the most responsible and satisfied with life.

poles — "very good" and "so bad". The system of standards is not demanding, which is explained either by the presence of idealized ideas that level out the very opinion about the possibility of achieving them or by the lack of ideas about what is perfect. Any result is a priori imperfect. A person believes oneself of responsibility. He or she does not seek to grow personally and perceives reality pessimistically. This results in low self-esteem and complete dissatisfaction with life.

Student age is a special stage of a person's age development, which was considered by psychologist B.G. Ananiev as an independent category. "From the point of view of the age period, students are within the framework of the psychology of mature ages, acting as a transitional stage from maturation to maturity, and are defined as late youth-early adulthood." [13, p. 23] It is possible to reduce the overall level of perfectionism, while the realistic standards and constructive requirements for oneself and the environment are achieved by means of professional psychological training [14]. One should develop a training program for the formation of personal maturity for environmental engineer by reducing the overall level of perfectionism to constructive one [15].

According to the domestic psychologist L.S. Vygotsky, the age from 18 to 25 years is the initial stage in a series of mature ages, which is why he called the period of late adolescence “the beginning of mature life”, thus differentiating childhood and adulthood [16].

From the point of view of B.G. Ananiev, the period from 17 to 25 years is an important life stage, since within its framework the final formation of the personality and the main stage of professionalization are completed [13, p. 23]. An important new formation of this period is the development of self-education and self-knowledge. This includes the following elements:

1. cognitive element (discovery of one's "I"),

2. conceptual element (representation of one's individuality),


Difficulties in the socialization of young people at the stage of education in universities are due to certain features. The training system is characterized by a huge amount of material, independence and responsibility. The greatest difficulties lie in changing the social position, changing the ways of learning activities, attitudes and behavioral stereotypes. "The social situation of personality development at student age is defined by the fact that young people are faced with the task of finding their place in society, starting independent work. In this regard, the social requirements for boys and girls are subject to changes, the social conditions in which their personal formation takes place are changing: they must be prepared for work, the performance of civic duties" [16, p.39].

Student-age population is sensitive for perfection tendencies manifestation in young people, which is explained by the influence of socio-economic and cultural factors [17]. Such changes as acquisition of independence by young people, their focus on the future, as well as their achievement of peak values of intellectual and creative abilities, which determine the desire for self-realization and self-assertion in the professional, educational and interpersonal spheres, can contribute to the formation of perfectionist tendencies as a form of personal maturity.
4 Discussion

We’ve studied the features of perfectionism using the “Multidimensional Perfectionism Scale” by P. Hewitt and G. Flatt. Multidimensional Perfectionism Scale includes Normative Data for Subscales of Self-Oriented Perfectionism, Other Oriented Perfectionism, and Socially Prescribed Perfectionism for Community, Psychiatric Patient, and University Student Samples.

Students-future environmental engineers of Sevastopol State University took part in the study (N=30 people). The obtained results are clearly presented in Figure 1.

**Fig. 1.** The results of the “Multidimensional scale of perfectionism” by P. Hewitt and G. Flatt (in percent)

Based on the presented indicators of the methodology, it can be seen that more than half of the subjects (60%) have an average level of personality-oriented perfectionism, its low characteristics were revealed in 40% of the respondents (12 students), that is, such students make adequate demands on themselves, they perceive all their failures as experience and self-development. Students with a high rate of perfectionism “Self-oriented” was not found, but specifically such characteristics as: overestimated unrealistic demands placed on oneself, and increased self-examination, self-digging and self-criticism, which make it impossible to accept one’s own shortcomings, shortcomings and failures.

Only 3 students (10%) showed a high indicator with “Other-Oriented” perfectionism, which tells us about the presentation of exaggerated and unrealistic demands on others. 18 students characterize the average level of perfectionism, and 9 students from the entire sample (30%) have a low level of perfectionism aimed at others, that is, respondents do not feel that they are placed too high demands that must be met in order to deserve approval and acceptance.

Analyzing the results on the “Socially prescribed perfectionism” scale, it was found that all students from the sample had indicators within the average values. These students regard the demands placed on him by others as adequate and achievable.

Further, in Figure 2, we visually present the results of the test for determining the level of self-efficacy by M. Scheer and J. Maddux.
Fig. 2. The results of diagnostics according to the method of determining the level of self-efficacy by M. Scheer and J. Maddux in the adaptation of A. V. Boyarintseva (in percent)

Based on the results obtained, we can conclude that all students (30 people) have an indicator of assessing the self-efficacy of subject activity in the range of average values. These subjects assess the results of their activities situationally, they also see certain shortcomings in their activities and its results.

Most of the respondents have underestimated interpersonal self-efficacy (21 students). They evaluate themselves as people with a low level of communication, unable to communicate, with few contacts, undeveloped communication skills.

10% (3 people) believe that they – achieve high efficiency in communication, – are always friendly, sociable, – have a wide range of contacts, – all communication and communication skills are well developed.

This indicates that these students are confident that they have a sufficiently high communicative potential and experience that allows them to use various means of interaction and effectively implement them.

One should consider students’ indicators according to the methodology "Differential test of perfectionism by A. A. Zolotareva" (Figure 3).

Fig. 3. Results of diagnostics according to the method of "Differential test of perfectionism by A. A. Zolotareva" (in percent)

As it can be seen from Figure 3, most of the respondents have a normal type of perfectionism (21 people). That is, such students tend to strive for excellence, not conflicting with other motives, the ability to increase self-esteem based on achievements, hope for success, experiencing slight excitement, excitement, easy entry into activities, focusing on their own resources, self-confidence.
The rest of the students (9 people) are characterized by a pathological type of perfectionism, and specifically they are characterized by: the desire of the individual for an ideal, perfect result, chronic dissatisfaction with one's life, oneself, disappointment in life, a complete refusal to achieve the intended ideal goal, inadequate testing of reality and oneself, as well as a chronic feeling of fatigue is possible.

Thus, we can say that most of the sample has already developed personal maturity, which characterizes them as diligent, always achieve their goal, and if they fail, they can easily change it. They are usually guided by emotions. They are independent and strive to achieve high results in activities that are important to them. The rest (20% / 6 students) of the subjects have an unsatisfactory level of personal maturity.

When studying the features of perfectionism, according to the results of the methodology «Multidimensional scale of perfectionism», the levels of perfectionism were equally distributed, namely, half of the sample had low indicators of perfectionism, and the other half had average ones. That is, this group of subjects can be characterized as: they make adequate demands on themselves, they perceive all their failures as experience and self-development; the respondents do not feel that they are set too high demands that must be met in order to earn approval and acceptance, and these students also regard the requirements made to them by others as adequate and achievable.

The results according to the method of A. Zolotareva aimed at studying perfectionism among students show that most of the respondents have a normal type of perfectionism, that is, such students tend to strive for excellence without conflict with other motives, the ability to increase self-esteem based on achievements, hope for success, experiencing slight excitement, excitement, easy entry into activities, concentration of attention on their own resources, self-confidence.

The next step in empirical research is to test:

$H_0$ - there is a relationship between person’s maturity and perfectionism among students.

$H_1$ - there is no relationship between person’s maturity and perfectionism among students.

Correlation analysis (Pearson’s criterion) was used to identify the relationship between students' personal maturity and perfectionism. The Pearson correlation coefficient $r$ reflects the degree of linear relationship between two sets of data. The indicator of the closeness of the relationship between two features is determined by the formula of the linear correlation coefficient:

$$r = \frac{\Sigma (x - \bar{x})(y - \bar{y})}{\sqrt{\Sigma (x - \bar{x})^2} \Sigma (y - \bar{y})^2}$$

Calculations were made in EXEL, the results are presented in Table 2.

<table>
<thead>
<tr>
<th>Ability for psychological affinity</th>
<th>Motivation for achievement</th>
<th>Self-concept</th>
<th>Feeling of civic duty</th>
<th>Life attitude</th>
<th>Sum of points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal type of perfectionism</td>
<td>-0.41</td>
<td>-0.58</td>
<td>-0.52</td>
<td>-0.36</td>
<td>-0.65</td>
</tr>
<tr>
<td>Pathological type of perfectionism</td>
<td>0.28</td>
<td>0.03</td>
<td>-0.01</td>
<td>-0.47</td>
<td>0.11</td>
</tr>
<tr>
<td>Integral scale</td>
<td>-0.27</td>
<td>-0.27</td>
<td>-0.37</td>
<td>-0.31</td>
<td>-0.55</td>
</tr>
</tbody>
</table>

Table 2. Correlation analysis results
The following significant correlations between students’ reflexivity and self-efficacy were identified:

– the ability for psychological intimacy is negatively, moderately associated with the scale of the normal type of perfectionism ($r = -0.41$);

– achievement motivation is negatively related to the scale of the normal type of perfectionism ($r = -0.58$);

– the self-concept is negatively, significantly associated with the scale of the normal type of perfectionism ($r = -0.52$), the integral scale of perfectionism ($r = -0.37$);

– a sense of civic duty is negatively, moderately associated with the scale of the normal type of perfectionism ($r = -0.36$), pathological type of perfectionism ($r = -0.47$), self-oriented perfectionism ($r = -0.48$);

– life attitude is negatively, significantly associated with the scale of normal perfectionism ($r = -0.65$), pathological type of perfectionism ($r = -0.55$), moderately associated with self-oriented perfectionism ($r = -0.37$), moderately associated with other-oriented perfectionism ($r = -0.41$), moderately associated with socially prescribed perfectionism ($r = -0.35$);

– the total score according to Gilbukh is highly associated with the scale of normal perfectionism ($r = -0.75$), moderately associated with the integral scale of perfectionism ($r = -0.4$).

Consequently, it became possible to conclude that there is a relationship between the personal maturity and perfectionism of students—environmental engineers, namely, a negative relationship was found between the components of personal maturity and perfectionism. In our case, with an increase in the value of indicators of personal maturity, in most cases it corresponds to a decrease in the value of the level of perfectionism among students. Then, one should develop a training program for the formation of personal maturity in students—future environmental engineers by reducing the overall level of perfectionism to constructive.

Theoretical analysis and empirical study of the problem of personal maturity and perfectionism among students made it possible to clarify recommendations for increasing the level of perfectionism to a constructive one.

We will consider the constructive perfectionism of students—future environmental engineers, in the program, as an integrative personal education, consisting of researching components of personal, cognitive—activity, social components (Table 3).

### Table 3 Components of constructive perfectionism

<table>
<thead>
<tr>
<th>Constructive perfectionism components</th>
<th>Training program features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td>It is important to focus on the development of an emotional and value attitude towards oneself</td>
</tr>
<tr>
<td>Cognitive—activity</td>
<td>To contribute to the development an ability to set goals in students’ educational and professional activities.</td>
</tr>
<tr>
<td></td>
<td>To promote the development of skills and abilities to achieve success in students’ educational and professional activities.</td>
</tr>
<tr>
<td></td>
<td>To facilitate acquired individual experience application for</td>
</tr>
<tr>
<td>Social</td>
<td></td>
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</tbody>
</table>


To fix students' attention on achievements and successes in educational and professional activities.

Social It is necessary to promote the development of a realistic perception, understanding and evaluation of other people.

The implementation of the developed recommendations for educators can be implemented with the help of socio-psychological training for students with a high or pathological level of perfectionism to develop an emotional and value attitude towards oneself, the ability to set goals in educational and professional activities, the development of anticipatory and communicative competence, or with the help of training on the formation of constructive perfectionism of students, developed by domestic psychologists (M.V. Larskikh, A.S. Raspopova, Ya.O. Zhebrun).

The purpose of the program is to create conditions for increasing the level of personal maturity, contributing to the development of normal or constructive perfectionism among future environmental engineers.

The following program objectives are:

1. To introduce the participants of the training; create favorable conditions for the work of the group.
2. To contribute to the development in educational and professional activities of the ability to set goals.
3. To teach students to fix the attention to achievements and successes in educational and professional activities.
4. To create conditions for improving interaction between students and realistic perception, understanding and evaluation by students of other people.

The following conditions of the training process: 6 lessons, once a week, the duration of each lesson is 2 hours. The number of group members is up to 15 people. The training program is shown in Table 4.

<table>
<thead>
<tr>
<th>Theme of the lesson</th>
<th>Purpose of the lesson</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Introduction&quot;</td>
<td>Creating a favorable atmosphere, determining the rules for teamwork as well as an indication of the reasons why they chose &quot;Environmental engineering&quot; specialty</td>
<td>2</td>
</tr>
<tr>
<td>&quot;My goal in life&quot;</td>
<td>Formation of the development in educational and professional activities of students of the ability to set goals.</td>
<td>2</td>
</tr>
<tr>
<td>&quot;My achievements&quot;</td>
<td>Development of fixing students' attention to achievements and successes in educational and professional activities as environmental engineers</td>
<td>2</td>
</tr>
<tr>
<td>&quot;My activity as an environmental engineer&quot;</td>
<td>Teaching students a holistic and conscious perception of their activities and its stages.</td>
<td>2</td>
</tr>
<tr>
<td>&quot;Others and I&quot;</td>
<td>Formation of realistic perception, understanding and evaluation by students of other people</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4. The program of training lessons aimed at the formation of constructive perfectionism and personal maturity among students - future environmental engineers.
Thus, the implementation of this training program will increase the level of personal maturity by reducing the overall level of perfectionism to constructive.

5 Conclusions

In order to summarize, it should be emphasized that the conducted empirical study was aimed at a diagnostic one of perfectionism among students. According to the results of diagnostics using the “Multidimensional scale of perfectionism” method by P. Hewitt and G. Flatt, more than half of the respondents (60%) have an average level of personality-oriented perfectionism, its low characteristics were revealed in 40% of the respondents (12 students). With “Other-Oriented” perfectionism, only 3 students (10%) showed a high indicator, which presents the exaggerated and unrealistic demands on others. 18 students characterize the average level of perfectionism, and 9 students from the entire sample (30%) have a low level of perfectionism directed at others. According to the “Socially prescribed perfectionism” scale, it was found that all students had indicators within the average values.

The results of the methodology for determining the level of self-efficacy by M. Scheer and J. Maddux in the adaptation of A.V. Boyarintseva showed that all students (30 people) had an indicator of assessing the self-efficacy of objective activity that was in the range of average values. First of all, one should note that most of the respondents have underestimated interpersonal self-efficacy (21 students). 10% (3 people) believe that they achieve high efficiency in communication.

The indicators according to the method “Differential test of perfectionism” by A.A. Zolotareva show that most of the respondents have a normal type of perfectionism (21 people). The rest of the students (9 people) are characterized by a pathological type of perfectionism.

Thus, in the course of an empirical study using Pearson’s correlation analysis, it was revealed that person’s maturity and perfectionism are interrelated, the higher the person’s maturity, the lower the level of students’ perfectionism.

As the role of an environmental engineer is vital as it is he or she who applies engineering principles and scientific knowledge to address environmental challenges and promote sustainable development, graduates should be highly motivated to achieve the best results in order to contributed greatly to the progress of environmental thought.

Based on the results of an empirical study, a program was developed with the aim of developing person’s maturity among students through a decrease in the general level of perfectionism to a constructive one.

References


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