Development Of Professional Competence Of Students Based On Mathematics Training Through Software Tools

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ABSTRACT

In this this article given some recommendations to teach you how to develop a software product using the Python programming language. In addition, interdisciplinary integration has been shown to be important in preparing future mathematicians for professional careers.

Keywords: Use of Python programming code, graphics, integratsion, compilation

Development of Information technology contributes more growth of knowledge in various fields. Many researchers note that because of the increase of information in the world net from year to year, it is still remained solving the issues of storage and processing. [1].

Furthermore, information and the volume of relevant knowledge that must be acquired in order to carry out successful professional activities in any field also increases.

The transvormalization of the vocational paradigm of education and the transition to a competent approach considered as a way to develop educational experience in the independent solution of knowledge, communication, organizational, moral and other problems in the modern world

In addition, the competency paradigm does not deny "knowledge", but it is formed on its basis and considers the development of the learners' ability and readiness to apply the knowledge which gained in professional activities from the point of view of a competent approach.[2].

Competence is a set of objective conditions that determine the possibilities and boundaries of the implementation of competency of an individual. Competence is a set of knowledge, skills and qualifications that allows you to effectively solve professional issues in their complicated activities and performs to the necessary actions in any area of life.[3].

In modern educational practice, mathematical training has the characteristic of the rapid development of fundamental and Applied Sciences, as well as mathematics as a complex educational discipline, which increases the level of informatization of society, while ensuring a constant increase in the content of mathematical education [4].

having a culture of thinking, being able to generalize, analyze, perceive information, set goals and choose ways to achieve it;

striving for self-development, improving skills and improvement;

readiness to use the Basic Laws of mathematical and natural scientific disciplines in professional activities, application of methods of mathematical analysis and modeling, theoretical and experimental research;

At the same time, these meenary documents indicate the need for the implementation of a competently approach to the formation and development of professional skills of students, the widespread use of active and interactive forms of classes in the educational process in combination with out-of-audience work.

athematical modeling of processes and objects based on Computer-Aided Design and research; being able to solve the exemplary tasks of professional activity on the basis of an information and bibliographic culture using information and communication technologies and taking into account the basic requirements of Information Security. [5]

The definition of professional competencies is carried out by the educational organization on the basis of Professional Standards corresponding to the professional activities of graduates in the fields and areas of professional activity of graduates.

In modern educational practice, mathematical training is characterized by the rapid development of fundamental and applied sciences, and mathematics as a complex academic subject ensures the continuous growth of the content of mathematical education as the information level of society increases [2].

Thus, the characteristics of mathematics as a scientific subject are characterized by a high degree of abstraction and formalization. At the same time, in order to successfully master the program of mathematical sciences, a student must have a developed level of mental and logical thinking as psychophysiological characteristics of perception that underlie such a concept as mathematical thinking.

The requirements of the state educational standard indicate to developers of educational programs the need to form components of mathematical competence sufficient to carry out professional activities.

The analysis allows us to identify the components of the mathematical competence of students in the education sector, including the ability to use methods of mathematical analysis and modeling, as well as the ability to build and implement a trajectory of self-development based on the principles of Education for life occupies a special place.

We believe that it is possible to determine the content of the necessary competencies for applying methods of mathematical analysis and modeling on the basis of the stages of mathematical modeling, since they relate to the components of professional activity defined in the State educational standard and qualification requirements:

The stage of formalizing a mathematical problem is the first stage of modeling. At this stage, the system under study is described: its purpose, nature of activity, resources used and regulation parameters are determined. When setting a problem, the modeling object (system, process) is studied, the available information is analyzed, and limitations and assumptions are determined. The construction of a mathematical model begins with the creation of a system of restrictions under which this model operates and a set of rules that determine permissible operations on an object.

When formalizing the problem, it is necessary to determine the functional relationship connecting the variables and parameters of the model. Then elements of formalization are introduced: familiarization with variables, parameters and formal symbols, indices, introduction of mathematical formulas.

This stage determines the introduction of formalization of competence as a mandatory component of the mathematical competence of bachelors in the direction of "Software Engineering".

The method for solving the problem is selected depending on the type of the resulting mathematical model. However, to use mathematical modeling in professional activities, it is necessary to have the appropriate competence, so we can talk about the competence of mathematical modeling as a component of mathematical competence.

Mathematical modeling competencies have been developed in pedagogical theory [3,4].

This competence plays a key role in the professional component of mathematical competence, since mathematical modeling becomes a working tool for the professional activity of bachelors in the field of "Software Engineering". The formation of students' mathematical competence based on working with the programming environment cannot be achieved without creating a mathematical model and using programming languages.

Definition of competencies in mathematical modeling using programming languages is defined as the ability to update and apply mathematical knowledge and methods in the process of solving professional problems using linear and object-oriented programming languages in constructing, analyzing and interpreting mathematical problems. models. Therefore, the ability to use mathematical modeling in programming languages is inextricably linked with mathematical competence.

For instance:

This $J = \int_0^1 x\sqrt{1 + x^2}dx$

let be an integral. In this integral $\sqrt{1 + x^2} = t$, $x = \sqrt{t^2 - 1}$

we will perform a replacement.

In this $\quad x = 0 \ $ da $\ t = 1, \ x = 1 \ $ da $\ t = \sqrt{2}$
$dx = \left(\sqrt{t^2 - 1}\right)' \cdot dt = \frac{t}{\sqrt{t^2-1}}dt$

so, $J = \int_1^{\sqrt{2}} t^2 dt = \frac{t^3}{3}\Big|_1^{\sqrt{2}} = \frac{2\sqrt{2}-1}{3}$

In the end, $\int_0^1 x\sqrt{1 + x^2}dx = \frac{2\sqrt{2}-1}{3}$.

Python code

```
import numpy as np

import matplotlib.pyplot as plt

def integrand (x:

""Verilene integrand fonction

return x * np.sqrt(1 + x ** 2

baslangic = -10

bitis = 10

adim_sayisi = 1000
```

```
x_degerleri = np.linspace(baslangic, bitis, adim_sayisi

y_degerleri = integrand (x_degerleri

# Graphic drawing

plt.plot (x_degerleri, y_degerleri)

plt.xlabel ('x'

plt.ylabel ('y'

plt.title ('∫x*sqrt (1+x2)')

plt.grid (True

plt.show()
```
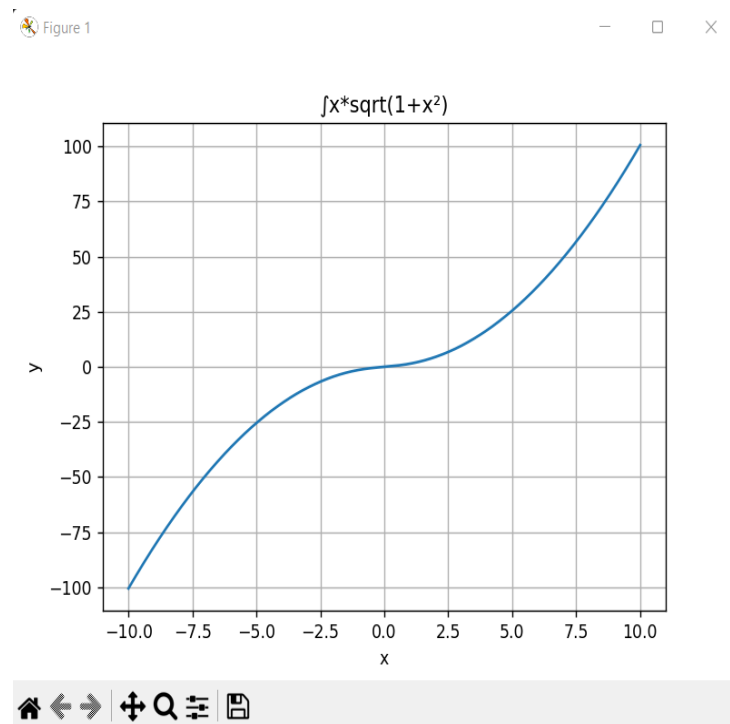

Program result

Defining competencies of mathematical modeling using programming languages we define mathematical knowledge and methods as the ability to update and apply mathematical models in construction, analysis and interpretation in the process of solving professional problems using linear and Object Oriented Programming Languages[5].

Finally, the ability to apply mathematical modeling in programming languages is inextricably linked to mathematical competence. Mathematics teaching in this regard, it is advisable to form

and develop the metacognitive abilities of students in the teaching of mathematics.

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