

Ministry of Education and Science of Ukraine
Ternopil Ivan Puluj National Technical University

Faculty of Computer Information System and Software Engineering

(full name of faculty)

Department of Computer Science

(full name of department)

QUALIFYING PAPER

For the degree of

Bachelor

(degree name)

topic: **Development of a Web-resource for organizing and conducting tests and surveys**

Submitted by: fourth year student _____, group **ICH-43**
specialty **122 Computer science**

(code and name of specialty)

	_____	Omosofe Joshua Toluwanise
	(signature)	(surname and initials)
Supervisor	_____	Duda O.M.
	(signature)	(surname and initials)
Standards verified by	_____	Matsiuk O.V.
	(signature)	(surname and initials)
Head of Department	_____	Bodnarchuk I.O.
	(signature)	(surname and initials)
Reviewer	_____	_____
	(signature)	(surname and initials)

Ternopil
2022

6. Advisors of paper chapters

Chapter	Advisor's surname, initials and position	Signature, date	
		assignment was given by	assignment was received by
Occupational health and emergency safety			

7. Date of receiving the assignment _____

TIME SCHEDULE

LN	Paper stages	Paper stages deadlines	Notes
1	Analysis of the task for qualifying work. Selection and work with literary sources.		<i>Completed</i>
2	Writing chapter 1		<i>Completed</i>
3	Writing chapter 2		<i>Completed</i>
4	Writing chapter 3		<i>Completed</i>
5	Writing chapter 4		<i>Completed</i>
6	Standartization control		<i>Completed</i>
7	Plagiarism check		<i>Completed</i>
8	Preliminary defense of qualifying paper		<i>Completed</i>
9	Defense of qualifying paper		

Student _____
(signature)

Omosofe Joshua Toluwanise _____
(surname and initials)

Paper supervisor _____
(signature)

Duda O.M. _____
(surname and initials)

ANNOTATION

Development of a Web-resource for organizing and conducting tests and surveys // Diploma thesis Bachelor degree // Omosofe Joshua Toluwanise // Ternopil' Ivan Puluj National Technical University, Faculty of Computer Information System and Software Engineering, Department of Computer Science // Ternopil', 2022 // P. __, Fig. – __, Tables – __, Annexes – __, References – __.

Keywords: web resource, tests, surveys, a learning process.

The work intends to develop an online resource for organizing and conducting tests and surveys within the learning process. Programming languages JavaScript, PHP, Apache web server, MySQL direction system AJAX technology were used for creating a resource. The developed software allows looking at data about passed tests and surveys, further as create new ones or pass them.

LIST OF SYMBOLS, UNITS, ABBREVIATIONS AND TERMS

DBMS – Database Management System.

HTML – Hypertext Markup Language.

API – Application Programming Interface.

HTTP – Hypertext Transfer Protocol.

XML – Extensible Markup Language.

JSON – JavaScript Object Notation.

SOAP – Simple Object Access Protocol.

SOA – Service-oriented Architecture.

REST – Representational State Transfer.

ROA – Resource-oriented Architecture.

RDF – Resource Description Framework.

MVVM – Model-View-ViewModel.

MVC – Model-View-Controller.

AJAX – Asynchronous JavaScript and XML.

DHTML – Dynamic HTML.

DOM – Document Object Model.

CSS – Cascading Style Sheets.

URL – Uniform Resource Locator.

FTP – File Transfer Protocol.

UID – User identifier.

GID – Group identifier.

SQL – Structured Query Language.

CONTENTS

INTRODUCTION.....	7
1 THE PROBLEM OF WEB-RESOURCE DEVELOPMENT FOR ORGANIZATION AND CONDUCT OF TESTS	9
1.1 Surveys in the educational process	9
1.2 Overview of existing software solutions	10
1.3 The concept of web resources for organizing tests and surveys in educational process	11
2 METHODS AND MEANS OF WEB-RESOURCE IMPLEMENTATION .	18
2.1 Choice of software architecture	18
2.2 Description of server architecture.....	19
2.3 Client application architecture description	21
2.4 Description of development tools	22
3 DESCRIPTION OF THE SOFTWARE IMPLEMENTATION	35
3.1 Architectural scheme of the software system	35
3.2 Description of system functionality.....	36
3.3 Database description	37
3.4 User cabinet development.....	42
3.5 System and installation requirements	43
4 OCCUPATIONAL HEALTH AND EMERGENCY SAFETY.....	50
4.1 Introduction.....	50
4.2 Rights, duties and responsibilities of employers and workers during outbreak and emergencies	51

4.3 Strategies and tools for protecting occupational safety and health in emergencies and outbreaks	52
4.4 Occupational safety and health controls	55
4.5 Conclusion of the chapter 4	56
CONCLUSION	58
REFERENCES.....	59

ANNEXES

INTRODUCTION

With the advancement of modern technologies, the dissemination and availability of information has increased in recent years. The Internet provides one-of-a-kind learning opportunities. The Internet is a place where a modern student can engage in active intellectual engagement. There are no limits to what you can learn, how you can develop your talents, and how you can increase your abilities. In turn, the teacher is given the opportunity to improve the control system. Specifically, by converting testing to an online format. There is a lot of interest in producing and. The usage of educational web resources is owing to serious, and to a large part, unforeseen circumstances. fair expectations for enhancing the educational process' efficiency and education's quality.

Educational online resources are data sets that reflect a specific field of study and are intended to support an individual's learning process, as well as the development of her knowledge, skills, and talents.

The use of constant knowledge control in the educational process improves learning motivation significantly, but teachers must conduct testing and put in a lot of effort to create projects and monitor their performance. Surveys can be done for students during their studies to improve the quality of the educational process; however, teachers will need to put in a large amount of effort to prepare all of the necessary questions and coordinate the process.

As a result, it was suggested that we look into the idea of building an online resource for organizing and conducting tests and surveys, which would allow us to regulate, automate, and use tests and surveys as much as possible in distance learning.

Modern methods of dynamic web page generation using computer languages JavaScript, PHP, and MySQL databases are used as development tools.

There are five sections to the explanatory note. The first section is devoted the problem statement is formulated, as well as the issues with organizing and conducting tests and surveys; the second section analyzes existing technologies for organizing and conducting tests and surveys; the third section substantiates the applied means of programming the set task; the fourth section describes software implementation, including information about the components software components and their interaction; and the fifth section concludes.

1 THE PROBLEM OF WEB-RESOURCE DEVELOPMENT FOR ORGANIZATION AND CONDUCT OF TESTS

1.1 Surveys in the educational process

The prevalence and availability of the Internet has opened up fresh chances for education in today's society, thanks to the development of modern technology in recent years. The Internet is not only an endless source of educational material, but also a source of active intellectual engagement for today's student, who has limitless opportunity to learn new things, enhance skills, and expand his or her abilities.

In turn, the teacher is given the option to improve the control system, specifically by translating tests online. Significant interest in creating and the use of educational web resources is due to serious, and to a large extent, reasonable expectations for improving the efficiency of the educational process and quality of education.

The following tasks must be completed:

- giving the user with a personal account where they may develop tests and surveys;
- ensuring very rapid control of knowledge and surveys; - enabling maximal automation of testing processes and procedures.
- allowing maximal automation of testing processes and surveys, as well as the usage of tests and surveys in distance learning;
- providing a user-friendly graphical interface that can be used on both a computer and a mobile phone.

Information from tests and surveys that are kept in the database should be used as input data.

HTML page displaying information about a test or survey should be the source data.

The outcomes of the work should be: test and survey results Advanced search and information display (visual menu, brief overview of test information or poll with ability to view full results) should be prioritized for simplicity of use.

The program must have numerous software tools for implementation, and the software system's design should include three components: client, server, and database.

The system should have three users: a system administrator, a teacher, and a pupil.

The system administrator must be able to log in to the system, modify information on teachers and students, and delete obsolete information if necessary.

Teachers should be able to construct quizzes and surveys, as well as have students review the results of their work.

Students should be able to locate the appropriate test or survey for passing, as well as review test and survey results.

The system should give detailed information regarding the assessments and surveys that teachers have prepared for their students. The resource must be able to interpret the most prevalent browsers in a short amount of time.

1.2 Overview of existing software solutions

Every year, a wider range of web materials becomes available.

They have already been used to build a variety of software that handles a wide range of practical problems. Organizing and conducting examinations and surveys in the educational process is one of them.

During the search for information and analysis of existing solutions, it was discovered that such systems are now fairly difficult to use or complete the task in full:

- The educational web resource "Perfect English Grammar" is a handbook as well as a collection of diverse English grammar activities and online assessments. The

downside of this approach for this work is that it does not allow you to log in to the system, whereas authorisation allows you to preserve the results collected.

- The Quizlet web resource is a tool for learning foreign languages that allows users to practice by completing various tasks and tests. Dane, because the program does not fully complete the task, the resource is only utilized for exam preparation and not for passage.

The bulkiness of these systems is another issue. These programs may appear dense and quite specialized in plan settings to newcomers.

The development of a convenient, intuitive, flexible, and undemanding to hardware system for testing and surveys is an essential job as the automation of tests in the learning process gains traction.

Development of a software system based on web technologies is one solution that can run on any modern device.

1.3 The concept of web resources for organizing tests and surveys in educational process

Web resource, educational process, electronic educational resources, educational web resources, testing, and surveys are some of the terms used in this article.

A web resource is a collection of technical and software tools, as well as content, that is intended for distribution through the Internet.

The educational process is a set of administrative and instructional actions aimed at implementing educational content at a specific educational or certification level in compliance with state educational standards.

The instructional approach is designed to take advantage of modern technology.

The construction of an educated, harmoniously developed personality capable of regular updating of scientific knowledge is the aim of information technology training.

In the domains of engineering, technology, management systems, and organization, professional mobility and rapid adaptability to change and development in the socio-cultural realm are essential in a free market economy.

The use of electronic educational tools is an important aspect of the learning process. They serve educational and methodological purposes, and they are used to provide instructional activities for students. They are one of the most important parts of the information and educational environment. Educational web resources are an example of e-learning resources.

The adoption of new web technologies allows for considerable changes in the educational system, as well as ongoing informatization - an unstoppable and obligatory process. In this context, educational web resources are the most effective tool for boosting modern teachers' professional development.

Educational web resources are educational electronic resources in many formats (text, visual, archival, audio, and video formats) that are placed in the online space of a local or worldwide network [1].

They are classified into the following categories based on their functional purpose:

- educational;
- educational and methodical;
- reference;
- normative;
- scientific;
- pedagogical;
- software.

Thus, educational web resources (sites, blogs) support the activities of the subjects of interaction by providing informational presentation, advisory,

informational, educational, and training support the activities of the subjects of interaction, open new opportunities for public interaction, and allow:

- interactively convey information to the audience regardless of its territorial location;
- promptly cover the activities of the web resource based on the publication of news, reviews, catalogs of publications, as well as scientific, methodological and practical materials;

- to increase participation of teachers and students in Internet competitions, contests, and conferences by using modern communication tools such as e-mail, interactive conferences, and forums;

- to effectively organize a support services portal;
- to use modern communication tools such as e-mail, interactive conferences, and forums;
- to use modern communication tools such as e-mail, interactive conferences, and forums;

- to use modern communication tools such as e-mail, interactive conferences, and forums.

The use of information space in the sphere of education, and specifically in the actions of teachers, has become a requirement. Because new information technologies affect all components of education: content, methods, and organizational forms of learning, educational web resources can and should become one of the priority tools and ways for pedagogical community self-education; they are an effective organizational element of the regional system education, because they allow you to solve complex and relevant tasks of the teacher to ensure his intellectual and creative development.

Increased knowledge control efficiency is one technique to improve education quality. The goal of implementing control in the educational process is to determine the quality of information acquisition, measure its worth, and assign a grade to it.

Testing and evaluating pupils' knowledge is a process that requires active participation. The teacher not only records pupils' real knowledge, but also influences

the course and outcomes of the entire educational process. His job is to figure out the best way to verify information in order to identify students' accomplishments and motivate them to learn more.

It is vital to create an environment in which the student must work methodically while demonstrating patience and resolve.

One approach to attain this goal is to put knowledge control to the test.

Testing or knowledge test control is a method of objectively determining the degree of attainment of the ultimate goals of student instruction at a level where skill creation is established indirectly through situational tests [2].

Advantages of knowledge test control:

- objectivity - independence of test results from personal teacher-student relationships;
- simplicity of the procedure for recording (entering) the answer, independence of the assessment from writing techniques;
- quantitative evaluation criteria - availability of quantitative indicators to determine completeness and depth of assimilation of material;
- qualitative evaluation criteria - availability of qualitative indicators to determine completeness and depth of assimilation of material;
- equal requirements for student knowledge and skills through the use of tasks in the test of equal complexity, volume, and content;
- ensuring the necessary completeness of coverage of kn through the use of tasks in the test of equal complexity, volume, and content;
- ensuring the necessary completeness of coverage of kn through the use of tasks in the test of equal complexity, volume, and content;
- ensuring the necessary completeness of coverage of kn through the use of tasks in the test of equal complexity

- the ability to repeat the test conditions in order to clarify changes in training levels;
- an emphasis on modern educational technologies, such as the use of computer training and control systems;
- universality - all stages of the learning process are covered; - versatility - control, diagnosis, and correction of the training process are all possible;
- covers a large amount of material control;
- the quality of knowledge, skills, and abilities can be tested for a limited time, in a specified number of students;
- possible control of knowledge, skills, and abilities on the necessary, in advance planned level;
- self-control is real;
- the student's attention is fixed not on the formation of the answer, but on the understanding of its essence;
- create conditions for constant feedback between the student and the teacher.

As a solution to the challenge of improving educational quality, test control of knowledge leads to the following conclusions:

- There are a variety of forms and means of quality control of students' knowledge, which is an urgent problem whose solution is caused by the needs of pedagogical practice and prospects for the integration of Ukraine's education system with the European community;
- use of test tasks, in particular in disciplines related to computer technology and in computer form, is practiced in most foreign universities and finds a response in the Ukrainian higher school [3];
- intrusion tests, which are used in most foreign universities and find a response

- Due to the rapid aging of scientific information, teachers must keep not only their lecture materials up to date, but also the corresponding control test tasks and educational and methodical materials;

- It is recommended that students in higher education institutions be systematically prepared for testing in all courses and during practice.

When traditional techniques of testing and measuring knowledge are combined with new technologies, teachers have a lot of options. Testing is the best way to maintain knowledge control. There is no doubt that the establishment and consistent application of the system test control of knowledge acquisition are closely related to increasing the quality of student learning [4]. This issue takes on new significance in our time, as considerable attempts are done to integrate Ukraine's higher education system into the European university community, spreading the concept of the "Bologna Process."

The quality of education is largely determined by the efforts of the teachers. Accordingly, one of the most challenging and significant duties in education quality management is the control and evaluation of the quality of the teacher's work.

A survey of students at particular intervals or after the study of certain topics might be one means of evaluating the work of teachers [5].

A survey is a means of gathering sociological data on a subject object through direct or indirect communication between the interviewer and the individual who answers the question.

Using student surveys to assess teaching quality will allow teachers to better regulate and estimate the quality of their work, which is a prerequisite for enhancing professional and pedagogical knowledge and abilities [6]. For students, the survey allows them to assess not just the teacher, but also themselves as participants in the educational process. Surveys can also aid students and teachers in resolving organizational challenges.

The use of constant knowledge control in the educational process enhances learning motivation, and surveys improve the educational process' quality. However, in order to conduct a test or interview, teachers must put in a lot of effort to create tasks and manage the process. This is why it is crucial.

The solution to this problem is to organize tests and surveys using web resources, which allows you to regulate and automate testing and survey processes as much as possible, and employ tests and surveys in distance learning.

2 METHODS AND MEANS OF WEB-RESOURCE IMPLEMENTATION

2.1 Choice of software architecture

It was solved after an analysis of the task and the strategies used to solve it. to create a software bundle using web-based technologies. The biggest benefit. The variety and capability of a web application puts it ahead of other possibilities.

Without porting to the target operating system, use on any device. (The target universal operating system is the browser and its virtual machine.) computer and system).

It was determined to employ a three-tier architecture to complete this work, which comprises of the following components: client, server, and database. This architecture is depicted in Figure 2.1.

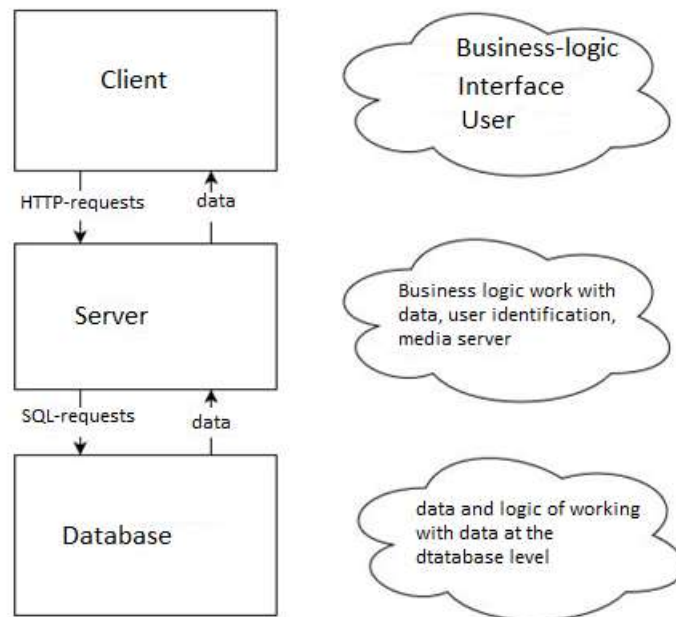


Figure 2.1 - Three-tier software architecture

The server is the software package's main hub. Basic business logic and database access logic are concentrated here. Individual access to software applications is offered by using a server user identification. To prevent data corruption and misuse, the server is the only connection between the user and the database. Because you must be permitted in the system to use the application, this logic is implemented at the server level, because at the user level, access privileges and other ways of uncontrolled access to data can be substituted.

The user interacts with the client, which in this case is the website, while using the program. The interface through which the software is set up and work outcomes are viewed has been implemented at the user level. Data is pre-processed at the user level before being sent to the server, and the server's results are also processed.

The first tier of user authentication for limiting uncontrolled access to the software is at this level.

The database level is responsible for ensuring the preservation of data that the server saves for later use. External linkages and keys are also used to verify data integrity. It is also possible to construct certain business logic at the database level that does not involve the usage of any other data sources other than the database and its tables.

2.2 Description of server architecture

The server programming was implemented via an API, or application interface.

A set of subroutine definitions, interoperability protocols, and software development tools make up the API. Simplified

Is a collection of well-defined methods for interacting with various components.
Program

The API gives capabilities for quick program development to the developer. APIs can be used in web-based applications.

Operating systems, databases, hardware, and software libraries are all examples of software libraries.

One of the most typical uses of the API is to make a set of commonly used functions, such as drawing a window or displaying icons on the screen, more generally available.

Programmers make use of the API's functionality to avoid having to create everything from scratch. The API is an abstract term - software that provides access to a set of APIs, also known as an API implementation. The API is frequently included in development suite software; however, the development kit might include both API and other tools / hardware, thus the two phrases are not interchangeable.

When using an API in web development, the API is usually determined by a set of HTTP request messages, as well as the structure of messages-responses, which is commonly defined in XML markup or JavaScript (JSON) format [7]. While the API has long been associated with web services, the trend has recently shifted (so-called Web 2.0) away from Simple Object Access Protocol (SOAP)-based web services and service-oriented architecture (SOA) in favor of more direct representational state (REST)-style web resources and resource-oriented architecture (ROA).

The transfer of the Semantic Web Resource to the Description of Platforms (RDF), as well as the creation of web tools for engineering ontologies, are all part of this trend. Hybrid APIs are web APIs that allow you to integrate several application software interfaces in new applications.

2.3 Client application architecture description

The client application, which was given the MVVM design template, was built using a framework (Figure 2.2).

The MVVM template makes it simple to divide GUI development from business logic (back-end logic), also known as the model (representation from model separation) [8]. Part of the representation model is in charge of transforming data for further support and use. In this sense, the representation model is more like a model than a representation, as it handles the vast majority, if not all, of the data display logic. A mediator pattern can also be used to create Model Submissions by structuring access to back-end functionality around the many usage criteria that are provided by the presentation.

The MVVM template is useful when there is "data binding" on the platform where development is taking place.

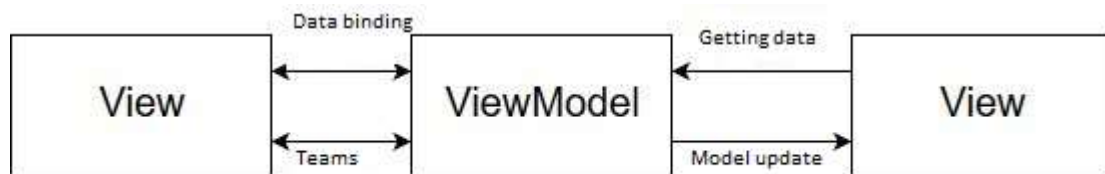


Figure 2.2 - Schematic of the MVVM template

The following components make up the MVVM template: - Model (Model), which, like the standard MVC template, is vital data for the application;

- The view model (ViewModel, which means "Model of View") on the one hand is an abstraction of the View, and on the other hand offers a wrapper of data from the Models that must communicate, like in the standard MVC template.

2.4 Description of development tools

The software complex is based on three-tier design for program development. The major goal was to design a multiplatform solution utilizing open technologies, hence each level of this architecture was implemented using different technologies. e.

The following technologies were employed at the client level: JavaScript programming language, Vue.js web application framework, and Vuetify graphical interface framework.

On the server side, the PHP programming language, the Open Server server platform, and the Apache web server were utilized.

For the database level, MySQL was chosen. The web system was also built using AJAX technology.

JavaScript programming language, Vue.js and Vuetify frameworks

JavaScript is a prototype programming language that is dynamic and object-oriented. Most commonly used to develop client-side capabilities (end-to-end devices) for web page scripts that interact with the user, manage the browser, asynchronously communicate data with the server, and change the structure and look of the web page.

JavaScript is a scripting computer language with dynamic typing that is characterized as a prototype (subset of object-oriented). Aside from prototype, JavaScript partially supports other programming paradigms (imperative and partially functional) and architectural features, such as dynamic and weak typing, autonomous memory management, prototype imitation, and functions as first-class objects.

JavaScript is used for: - creating interactive scripts for web pages (React, AngularJS, Vue.js); - server-side programming (Node.js); - stationary applications

(Electron, NW.js); - mobile applications (React Native, Cordova); - scripts in application software (for example, in Adobe Creative Suite or Apache JMeter); - scripts inside PDF documents, and so on.

Despite their similar names, Java and JavaScript are two distinct languages with excellent semantics, albeit they share several standard libraries and naming conventions. The syntax of both languages is "inherited" from C, but the semantics and design of JavaScript are the product of Self and Scheme's impact [9].

JavaScript code is included in DHTML technology when it is employed.

An interpreter built into the browser executes the page's HTML code. Although most browsers use JavaScript as the default script, code JavaScript is put inside `Script>/Script>` elements.

Access to debugging tools is essential when constructing large and complex web apps with JavaScript. Because the JavaScript behavior and implementation Object model document change somewhat between browsers from different manufacturers, you must have a debugger for each browser if the web application is targeted to it.

Because JavaScript is an interpreter that does not require strict type and can run in a variety of settings, each with its own set of compatibility issues, the programmer must exercise extreme caution and ensure that his code works as intended in a variety of scenarios.

Each block of the script is parsed separately by the interpreter. If you put the script functions in a distinct block of code or (even better) utilize multiple little related.js files on web pages where you need to merge JavaScript and HTML blocks, it's easier to identify syntax issues. As a result, the grammatical error will not force the entire page to "fall," and you can gracefully exit the page.

JavaScript is supported by various frameworks, including Vue.js and Vuetify.

The Vue.js framework is a JavaScript framework that employs the MVVM template to generate reactive data binding user interfaces based on data models. The

Vue framework makes use of HTML templates that are syntax-based, allowing you to declaratively bind DOM rendering to the core data objects in Vue [10]. The inconspicuous jet system is one of Vue's most distinguishing features. Models are simple JavaScript objects. It has a very basic and intuitive state management system [11].

The Vuetify framework is a collection of open source tools for building websites and web apps. It includes CSS and HTML templates for typography, shapes, buttons, navigation, and other user interface elements, as well as JavaScript extensions. It makes creating dynamic websites and online apps easier [12].

PHP programming language

The PHP computer language is a server-side scripting language that was designed to generate HTML pages. Along with Java, .NET, Perl, Python, and Ruby, PHP is one of the most often used languages in web development. The vast majority of hosting companies support PHP. PHP is a free and open source programming language.

The web server converts PHP code into HTML code, which is then sent to the client. The user does not see PHP code, unlike the JavaScript programming language, because the browser receives ready-made HTML code. This is a security benefit, but it reduces the interactivity of the sites [13].

MySQL, PostgreSQL, mSQL, Oracle, dbm, Hyperware, Informix, InterBase, and Sybase are all supported by PHP's built-in libraries.

Because of the standard open interface for database connectivity, you can connect to any database that the driver supports.

The inclusion of a comprehensive collection of built-in tools for constructing web apps determines the popularity of website development [14]. The most important are: - automatic removal of POST and GET parameters, as well as environment variables web

servers in predefined arrays; - automatic removal of POST and GET parameters, as well as environment variables web servers in predefined arrays; - automatic removal of POST and GET parameters,

- interaction with a wide range of database management systems (MySQL, MySQLi, SQLite, PostgreSQL, Oracle (OCI8), Oracle, Microsoft SQL Server, Sybase, ODBC, mSQL, IBM DB2, Cloudscape and Apache Derby, Informix, Ovrimos SQL, Lotus Notes, DB ++, DBM, dBase, DBX, FrontBase, FilePro, Ingres II, SESAM, Fire

- transmitting HTTP headers automatically; - working with HTTP authorisation;
- working with cookies and sessions; - working with local and distant files, sockets; - processing files uploaded to the server

- Experiment with XForms.

The PHP programming language will be familiar to programmers in a variety of fields. C and Perl have influenced several language constructs. The PHP code looks a lot like what you'd find in a C or Pascal program. This drastically decreases the time and effort required to learn PHP. The PHP programming language is a unifying language that combines the advantages of Perl and C and is designed primarily for use online, with a universal and clear syntax [15]. Despite the fact that PHP is a relatively new language, it has grown in popularity among web programmers to become the most popular language for developing web applications (scripts).

You can avoid writing multi-line custom functions in C or Pascal by using a range of PHP features. PHP is a programming language that has a universal and simple syntax and is designed primarily for use on the internet. It's also worth noting that the source code is available for free.

One of the most significant advantages of PHP is that it belongs to interpreters. It enables the processing of scripts at a sufficiently fast rate [16].

The building of a syntactic parser, program, or portion of a parsing software is one of the PHP language's applications. The software goes to the supplied

site and loads the HTML page, then parses and processes the data in accordance with the job [17] using the specified list of URLs.

Efficiency is critical in developing for systems with a large number of users, such as the Web. The fact that PHP is an interpreted language is a significant advantage. This enables you to handle scripts at a sufficient rate. According to some assessments, most PHP scripts (especially those of moderate size) are processed faster than similar Perl scripts. Whatever the PHP developers accomplish, the built executive files will run significantly faster - by dozens, if not hundreds, of times faster. However, PHP's performance is sufficient for sophisticated online applications.

Open Server server platform and Apache web server

Based on their recommendations, the Open Server platform is a portable server platform and software environment built primarily for web developers.

The software package includes a significant number of server software programs, as well as a user-friendly, multifunctional interface with component administration and configuration capabilities. The platform is commonly used for developing, deploying, and testing online projects, as well as providing web services via local networks.

Apache, nginx, PHP, MySQL, phpMyAdmin, and FileZilla are all part of the Open Server platform.

The Apache Web Server is a free Internet web server that runs on UNIX-like systems, Microsoft Windows, Novell NetWare, and other operating systems. Many features are supported by the product, many of which are implemented as built modules that extend the product's fundamental capabilities. They differ from server support for programming languages when it comes to authentication systems. Perl, Python, Tcl, and PHP programming languages have their own interfaces. Virtual hosting features enable a single Apache installation to host many websites.

On the World Wide Web, the Apache web server is largely used for HTTP transmission of static and dynamic web pages. The software can be used as a caching proxy server, allowing local network users to considerably boost their productivity when working with documents that are stored on the Internet. The following proxy settings and options are available:

- the categories of files that should or should not be cached;
- the maximum amount of disk space allocated for caching;
- periodic scanning and indexing of the cache database to free up disk space by deleting old objects.

Basic functions such as parsing configuration files, the HTTP protocol, and the system download module are all included in the Apache kernel. The Apache Software Foundation develops the core (as opposed to modules) entirely on its own, with no help from third-party programmers.

The Apache kernel can theoretically function without the usage of modules in its purest form. However, such a solution's utility is severely constrained.

C is the only programming language used in the Apache kernel.

Text configuration files are used in the Apache configuration system.

It has three levels of conditional configuration:

1. setup of the server (`httpd.conf`);
2. configuration of the virtual host (`httpd.conf` from version 2.2 extra / `httpd.vhosts.conf`);
3. configuration of the directory level (`.htaccess`).

The web server has its own set of language directives in a block-based configuration file. Configuration files can be used to adjust almost all kernel parameters. The majority of modules have their own set of settings [18].

In their work systems, several modules use operating system configuration files (such as /etc / passwd and /etc / hosts). In addition, command line switches can be used to provide arguments [19].

There are several symmetric models for multiprocessing on the Apache web server:

- worker - a multiprocessor, multithreaded hybrid model Multiprocessor systems save time and money by allowing you to serve a large number of customers with less resources.

- pre-fork - a symmetric multiprocessing approach based on the formation of independent processes in advance;

- perchild - a hybrid model with a fixed number of processes;

- netware - a multi-threaded model optimized for use in the NetWare environment;

- winnt - a multi-threaded model created for the Microsoft operating system Windows;

- Apache-ITK - based on prefork models, a symmetric multiprocessing model. Allows you to use different UIDs and GIDs for each virtual host;

- peruser - a model built on the MPM perchild foundation. Allows anyone to run a virtual host with their own UID and GID. Thread is not used.

MySQL database management system

MySQL is a free relational database management system as well as a compact multithreaded database server with great speed, durability, and ease of use. The data in a relational database is kept in separate tables, allowing for increased speed and flexibility. Tables are linked together through relationships, which allows you to aggregate data from multiple tables when running a query table. The SQL language,

which is part of the MySQL system, is a structured query language for accessing databases.

MySQL is a solid choice for small and medium-sized applications.

Many systems compile server source code. The most comprehensive server capabilities can be found in UNIX systems that allow multithreading, which improves overall system performance [20].

MySQL server features include:

- ease of installation and use;
- database support for an unlimited number of concurrent users;
- the amount of rows in the tables can approach 50 million; - the speed with which orders are executed;
- the presence of an easy-to-use security mechanism.

MySQL is a free and open source database management system. Anyone can change it if you use it. In this case, each user can learn the source code and modify it to meet their specific requirements.

The MySQL system is divided into two parts: the server and the client.

On your PC, the MySQL server is always operating. Client applications (for example, PHP scripts) submit SQL queries to the MySQL server over sockets (i.e., across the network), which the server processes and saves as a result. In other words, the script (client) specifies what data it wants from the database server. The database server then provides the client (script) a response (result) [21].

MySQL has a three-tier structure: databases, tables, and records. Files with the extensions frm, MYD, and MYI are used to physically represent databases and MySQL tables.

The table is logically a collection of records. A record, on the other hand, is a collection of fields of various types. The MySQL database name is unique within the system, while tables and fields are unique within databases and tables, respectively.

One MySQL server can support multiple databases at the same time, each with its own login and password.

A MySQL database is a folder that includes files in a specific format - tables. Tables are made up of records, which are made up of fields. Name and type are the two attributes of the field.

mysql connect () is the main function for connecting to a MySQL server. It connects the script to the MySQL database server and performs user database authorisation [22]. mysql connect ([string \$ hostname] [, string \$ user] [, string \$ password]) is the syntax for this function. The mysql close (int \$ connection id) function is used to close the connection.

The connection cannot be closed in general; it will be closed automatically when the PHP script is terminated. However, this is a poor fashion choice. If there are more than one connection, supply the \$ connection id ID of the connection that has to be closed.

The mysql connect () function creates a standard MySQL connection. PHP, on the other hand, supports persistent connections; to do so, use the mysql pconnect function (). This function takes the same arguments as mysql connect (). The difference between a permanent and a simple connection is that the persistent connection is not terminated after the script's job is completed, even if the script uses the mysql close () function.

The mysql query () function sends all requests to the current database. Only one parameter is required for this function: the request text. The text of the request contains whitespace and newline characters (\ n). [23] The text should be made up of SQL syntax rules.

The client will receive a collection of records that can be handled using PHP functions if the query run using the mysql query () function is successful. The functions

`mysql_fetch_row ()`, `mysql_fetch_array ()`, and others are recommended for processing huge amounts of records.

The `mysql_fetch_row (int $ res)` method produces an array of data processed strings, or `FALSE` if no further strings can be found. It deals with a single row of the result, which is referred by the communicated pointer. The result of the series is an array.

Each column is located in the array's next cell. The array starts at index 0 and goes up from there. The following lines will be returned by subsequent calls to the `mysql_fetch_row ()` function, or `FALSE` if there are no more rows. The field names returned by this function are case-sensitive.

The `mysql_fetch_array (int $ res [, int $ result type])` returns an associative array with the following values that can be supplied by the optional `$ result type` parameter:

- `MYSQL_ASSOC` - returns an associative array;
- `MYSQL_NUM` - returns an array with numeric indexes, as in the function `mysql_fetch_row ()`;
- `MYSQL_BOTH` - returns an array with double indexes, i.e. it can be used as an associative array and as a list (`MYSQL_BOTH` is the default value)

AJAX technology

AJAX technology is a method of creating interactive web application interfaces for users that involves a "background" data exchange between the browser and the web server. As a result, the web page does not totally reload when you update the data, and online applications become faster and more convenient.

AJAX is a concept that combines multiple related technologies. It is not a stand-alone technology. It is founded on two major tenets:

the use of dynamic access technology to the server "on the fly," without having to entirely reload the page, such as: - utilizing XMLHttpRequest (main object); - through dynamic creation of child frames; - through dynamic creation of the script tag;

2. Change the page's content dynamically using DHTML.

The data communication format is typically JSON or XML.

Advantages: - saving traffic (using AJAX can significantly reduce traffic when working with a web application because it is often enough to load only the changed part, which is usually small enough); - reducing server load (AJAX allows you to reduce a bit load on the server); - accelerating interface response (because you only need to download part has changed, the user sees the result of their actions quickly); - reducing server load (AJAX allows you to reduce a bit load on the server);

Disadvantages:

- lack of integration with standard browser tools (dynamic pages are not logged by the browser in your browsing history, so the "Back" button does not work, allowing users to return to previously viewed pages; however, there are scripts that can solve this problem; another disadvantage of changing the content of a page with a constant URL is the inability to save a bookmark for the desired material; however, there are scripts that can solve this problem; Dynamically modifying the snippet ID (part URLs after #) that allows many browsers can partially fix these problems.

- Dynamically load content that isn't available to search engines (if not check query, it's normal or XMLHttpRequest); search engines can't run JavaScript, so developers should think about other ways to access site content; - old methods of site statistics accounting are becoming obsolete (many services statistics keep track of new page views). Such data are no longer relevant for sites that heavily use AJAX on their pages);

- project complexity (redistributed data processing logic - there is a selection and partial transmission to the customer of primary data formatting operations). This makes maintaining the integrity of formats and types difficult.

Unwarranted increases in the expense of coding and project management, as well as the danger of lower service availability for end consumers, can counteract the end result of technology.

- JavaScript must be enabled in your browser.

XMLHttpRequest - API call of a web client (browser) to a web server over HTTP in the background, for languages JavaScript, JScript, VBScript, and similar programs - is an important aspect of AJAX technology. Used for synchronous or asynchronous information interchange in any text format, particularly XML and JSON [7].

3.5. Rationale for choosing a software implementation

The subject area was investigated and analyzed, as well as customer needs, when creating the system. Following thorough consideration, it was decided to create a web-based software solution for use with a web browser.

The server technologies were chosen based on their ease of use, current relevance, and ability to run on any operating system. The Open Server platform is a very user-friendly server, allowing you to rapidly access your web server. Apache is the web server that allows you to run a variety of websites through web hosting. The database was accessed using the PHP programming language.

At the client level, technologies have been chosen that match the same requirements as the server, but have been tweaked for browser execution. The Vue.js framework was chosen because it allows developers to design rich graphical interfaces that are simple to adapt, test, and extend in following development cycles. Because it is a prototype scripting language with dynamic typing, JavaScript was chosen. The Vuetify framework was used to stylize the client application because of its large library of ready-to-use interfaces and built-in support for zooming to cell phone size.

MySQL was chosen as the database since it is an open source project with a large developer community. High speed, reliability, and the amount of built-in options are also key features.

Because of its capacity to use the web client (browser) API call to the web server according to the protocol HTTP in the background, AJAX technology was chosen to build the system.

Because all of these technologies are covered by licenses that exclude such access and allow access to the source code of these projects, it is possible to produce a high-quality and reliable solution that is shielded against patent litigation by developers.

3 DESCRIPTION OF THE SOFTWARE IMPLEMENTATION

3.1 Architectural scheme of the software system

The system for planning and performing exams and surveys in the educational process will be organized into many modules, each with a varied number of functional sub-blocks. The user's office will be the major module, and it will also be a part of the system layout. Because the modules are positioned in the sequence typically used to address comparable problems, such a structure is simple to allow and intuitively utilize the system.

The topology of the system on which the software modules are located is depicted in Figure 3.1.

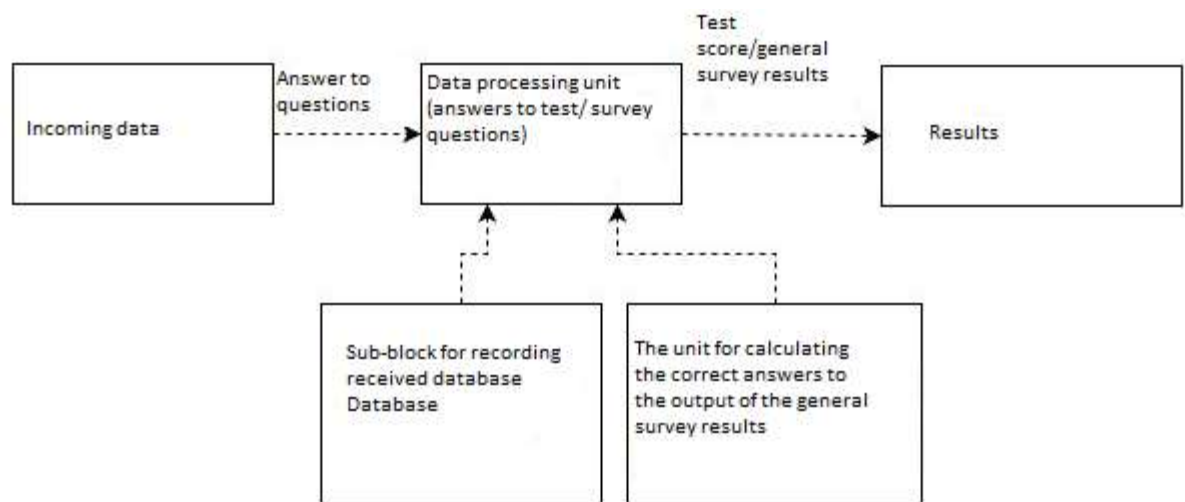


Figure 3.1 - Scheme of the structure of systems

The system receives and processes input data, such as answers to questions, and then performs computations and presents the outcome, such as the test score or general survey results.

3.2 Description of system functionality

Three primary players - users of the system - are involved in the software application for arranging and performing tests and surveys in the educational process; Figure 3.2 shows a previous diagram that describes the functions and activities of the system's actors.

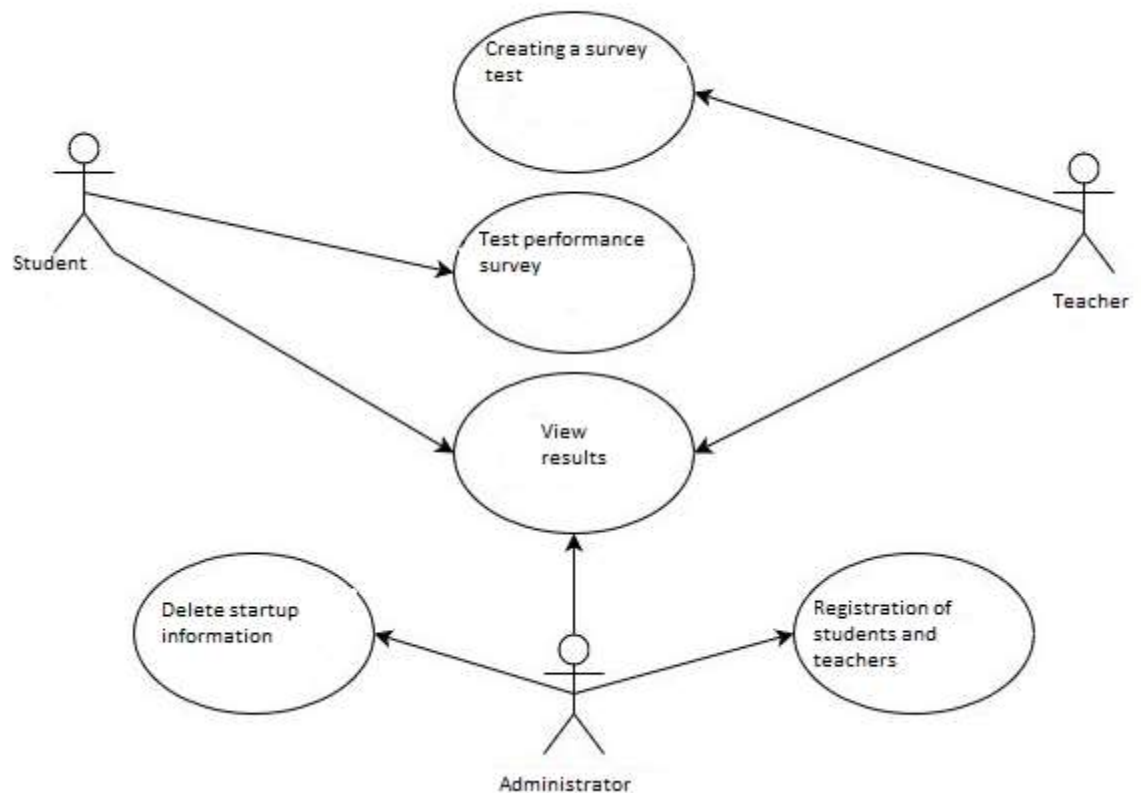


Figure 3.2 - Diagram of system precedents

There are three sorts of users, according to the diagram: student, instructor, and administrator. The teacher produces tests and questionnaires, which the student must complete. The administrator registers teachers and students in the system, as well as deletes obsolete data. The results of tests and surveys are visible to all three sorts of users.

3.3 Database description

The system's full content as well as its essential data, such as test and survey results, are saved in the database. The database's conceptual model is as follows (Figure 3.3):

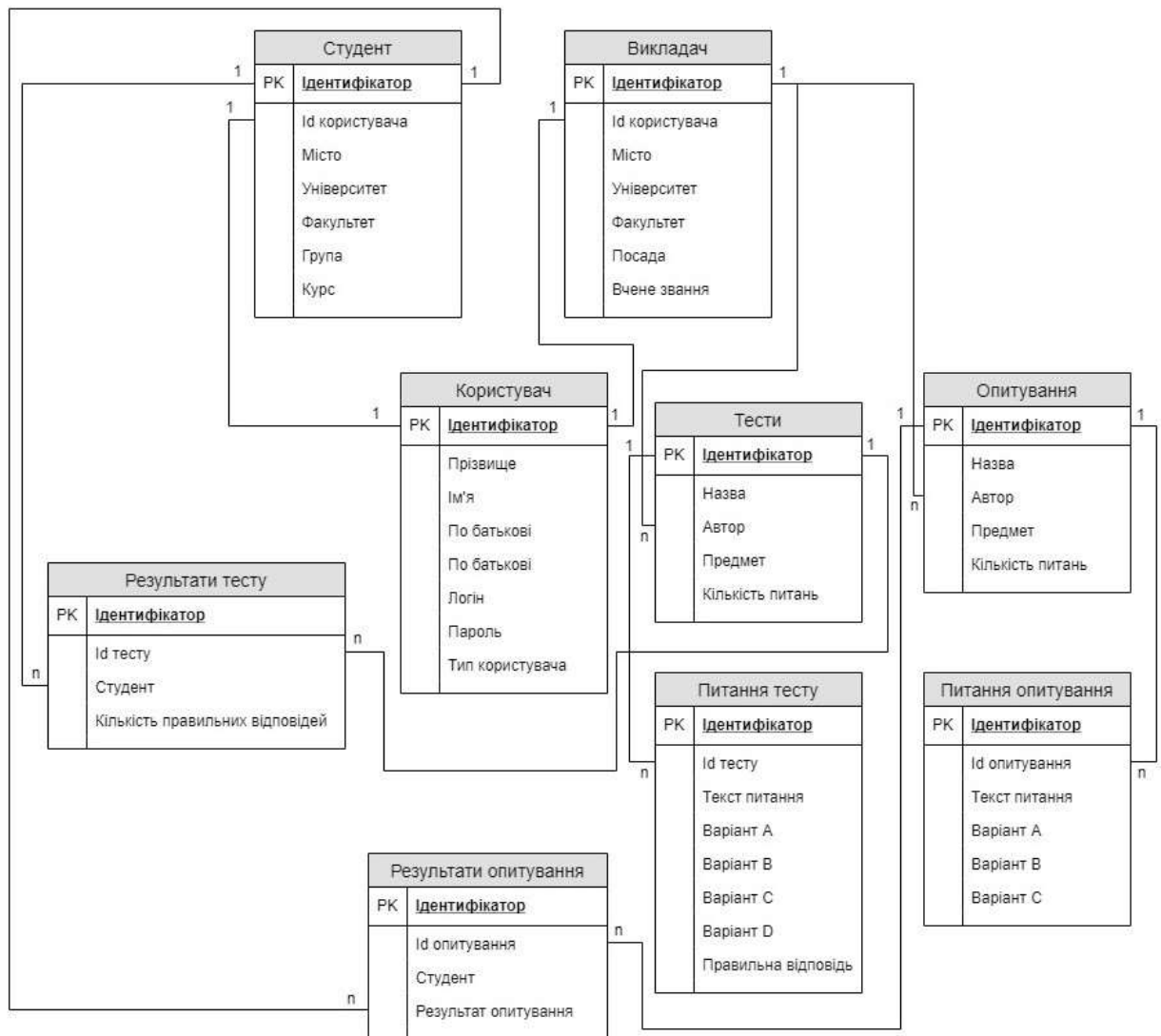


Figure 3.3 - Conceptual database model

The following tables make up the database: "User," "Student," "Teacher," "Tests," "Survey," "Test questions," "Question questions," "Test results," and "Survey results."

The following is the structure of the table "User" (table 3.1):

Table 3.1 - The structure of the table "User"

Field name	Field type and size	Field description
Id	int	Primary key
Surname	varchar	Name
Name	varchar	Name
Patronymic	varchar	Surname
UserName	varchar	User login
Password	varchar	Password
Status	int	User type

Because it conveys extensive data relating to each student (table 3.2), the "Student" table contains a link to the "User" table by ID user.

Table 3.2 - The structure of the table "Student"

Field name	Field type and size	Field description
Id	int	Primary key
IdUser	int	Id user
IdTown	int	Town
IdUniversity	int	University
IdFaculty	int	Faculty
IdGroup	int	Group
Course	int	Course

Identifier, Last Name, First Name, By Parental, Login, Password, and User Type are among the fields in the table.

The "Teacher" table contains a link to the "User" table user ID, as it expresses the details of each teacher (table 3.3).

Table 3.3 - The structure of the table "Teacher"

Field name	Field type and size	Field description
Id	int	Primary key
IdUser	int	Id user
IdTown	int	town
IdUniversity	int	University
IdFaculty	int	Faculty
Position	int	Position
AcademicTitle	int	Academic status

Identifier, Title, Author, Subject, and Number of questions are all fields in the Tests table. This table is linked to the "Instructor" table by ID author because it contains specific information on the test that the teacher prepared (table 3.4).

Table 3.4 - Structure of the "Tests" table.

Field name	Field type and size	Field description
Id	int	Primary Key
Name	varchar	Name
IdAuthor	int	Author
IdSubject	int	Subject
AmountQuestions	int	Amount Questions

Identifier, Title, Author, Subject, and Number of Questions are all fields in the Poll table. This table is linked to the "Teacher" table by author ID since it contains specific information on the teacher's survey (Table 3.5).

Table 3.5 - The structure of the table "Survey"

Field name	Field type and size	Field description
Id	int	Primary Key
Name	varchar	Name
IdAuthor	int	Author
IdSubject	int	Subject
AmountQuestions	int	Amount Questions

In each of the four potential answers, the Test Questions table comprises fields such as Field ID, Test ID, Question Text, Correct Answer, and Value. The test identifier links this table to the "Test" table (table 3.6).

Table 3.6 - Structure of the table "Test questions"

Field name	Field type and size	Field description
Id	int	Primary key
IdTest	int	Test ID
TextQuestion	varchar	Text Question
VariantA	varchar	Variant A
VariantB	varchar	Variant B
VariantC	varchar	Variant C
VariantD	varchar	Variant D
RightAnswer	int	Right answer

In each of the three answer possibilities, the Survey Question table comprises fields such as Field ID, Survey ID, Question Text, Correct Answer, and Values. By survey ID, this table is linked to the "Survey" table (Table 3.7).

Table 3.7 - Structure of the table "Questionnaire questions"

Field name	Field type and size	Field Description
Id	int	Primary key
IdPoll	int	Test Id
TextQuestion	varchar	Text Question
Variant A	varchar	Variant A
Variant B	varchar	Variant B
Variant C	varchar	Variant C

Fields like Field ID, Test ID, Student, and Number of Correct Answers can be found in the Test Results table. By test ID, this table is linked to the "Tests" table.

By student ID, the table is linked to the "Student" table (Table 3.8).

Table 3.8 - Structure of the table "Test results"

Field name	Field type and size	Field description
Id	int	Primary key
IdTest	int	Text ID
IdStudent	int	Student
AmountRightAnswers	int	Number of correct answers

Fields like Field ID, Survey ID, Student, and Survey Result can be found in the Survey Results table.

By poll ID, this table is linked to the "Poll" table.

By student ID, the table is linked to the "Student" table (Table 3.9).

Table 3.9 - Structure of the table "Survey results"

Field name	Field type and size	Field description
Id	int	Primary Key
IdPoll	int	Poll ID
IdStudent	int	Student
Result	int	Result of the survey

There are further tables in the database for cities, universities, faculties, disciplines, study groups, instructor positions, and academic titles, which have two fields: Identifier and Name. They are linked to the "Student" and "Teacher" tables.

3.4 User cabinet development

The main user's workstation in the system is the user's office. It is a component of the system's layout and comprises other submodules that conduct the system's major functions.

Submodules of the user cabinet:

The following modules are included in this set:

- test management module;
- survey management module;
- instructor and student data management module

Module for test management

This module allows users to manage test suites, including the ability to:

- create new tests (for teachers);
- take tests (for students);

- examine test results;
- delete obsolete test data (for administrators).

Module for survey management

This module allows the app's user to manage a series of polls, including the ability to:

- create new surveys (for teachers);
- take a survey (for students);
- examine survey results;
- delete obsolete survey data (for administrators).

Data management module for teachers and students

This module allows the application's user to manage the data of teachers and students, including:

- adding new teachers and students to the system (for administrators);
- changing the account's login and password;
- changing the basic data of the teacher or student (for administrators); and
- deleting the accounts of teachers and students (for administrators).

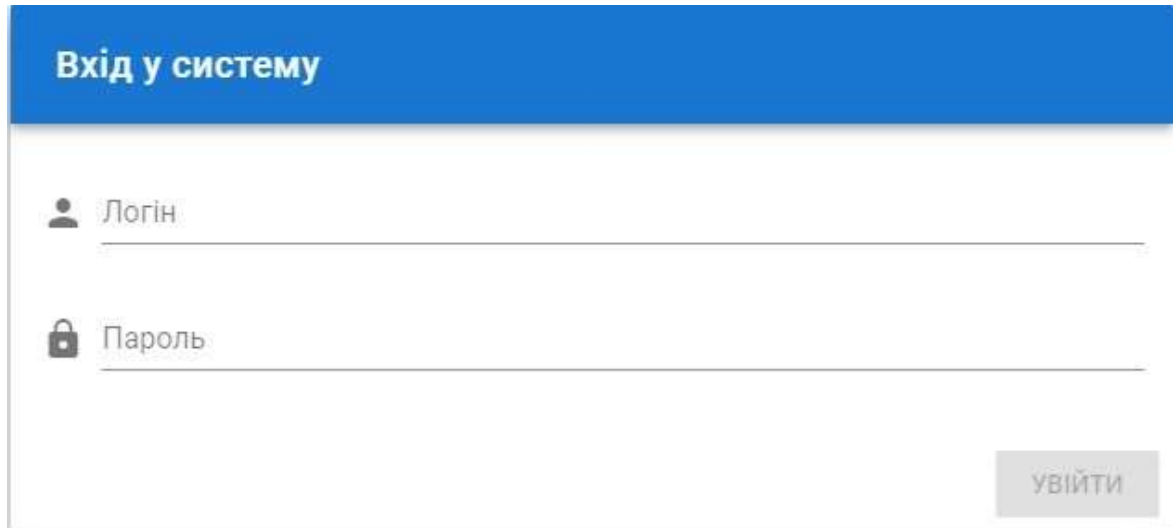
3.5 System and installation requirements

Because the software was created using web technologies, it will run in any browser that supports current web standards.

The program does not require installation on the user's device because it uses web technologies. You will, however, require a web browser that adheres to the most recent web standards. A reliable Internet connection with a speed of at least 50 Mbps

is also required. You must grant the client application the necessary permissions in order to use the program's features to conduct tests and surveys.

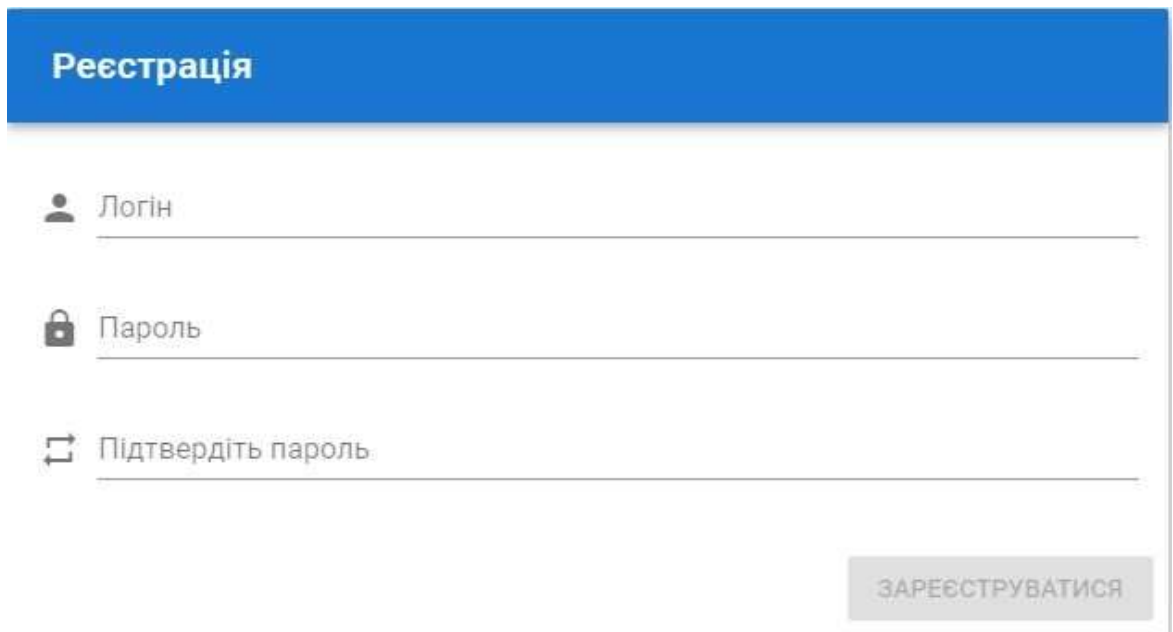
After logging in to the client application, the user must also log in to the system in order to begin working in it. The authorization form is shown in Figure 3.3.



The image shows a web form for system authorization. At the top, there is a blue header with the text "Вхід у систему" in white. Below the header, there are two input fields. The first field is labeled "Логін" (Login) and has a person icon to its left. The second field is labeled "Пароль" (Password) and has a lock icon to its left. Both fields have horizontal lines indicating they are text inputs. At the bottom right of the form, there is a grey button with the text "УВІЙТИ" (Log In).

Figure 3.3 - Authorization form

If the user has never used the system before or want to create a new profile, he must first register. The registration form is shown in Figure 3.4.



The image shows a web form for registration. At the top, there is a blue header with the text "Реєстрація" in white. Below the header, there are three input fields. The first field is labeled "Логін" (Login) and has a person icon to its left. The second field is labeled "Пароль" (Password) and has a lock icon to its left. The third field is labeled "Підтвердіть пароль" (Confirm password) and has a double-checkmark icon to its left. All fields have horizontal lines indicating they are text inputs. At the bottom right of the form, there is a grey button with the text "ЗАРЕЄСТРУВАТИСЯ" (Register).

Figure 3.4 - An example of a registration form

When a user registers in to the system, he is given access to the system's main menu. This menu gives the user access to all of the system's pages as well as the opportunity to log out of his profile. It can also go to the user's office, which is its primary workstation. The system's primary menu is shown in Figure 3.5.

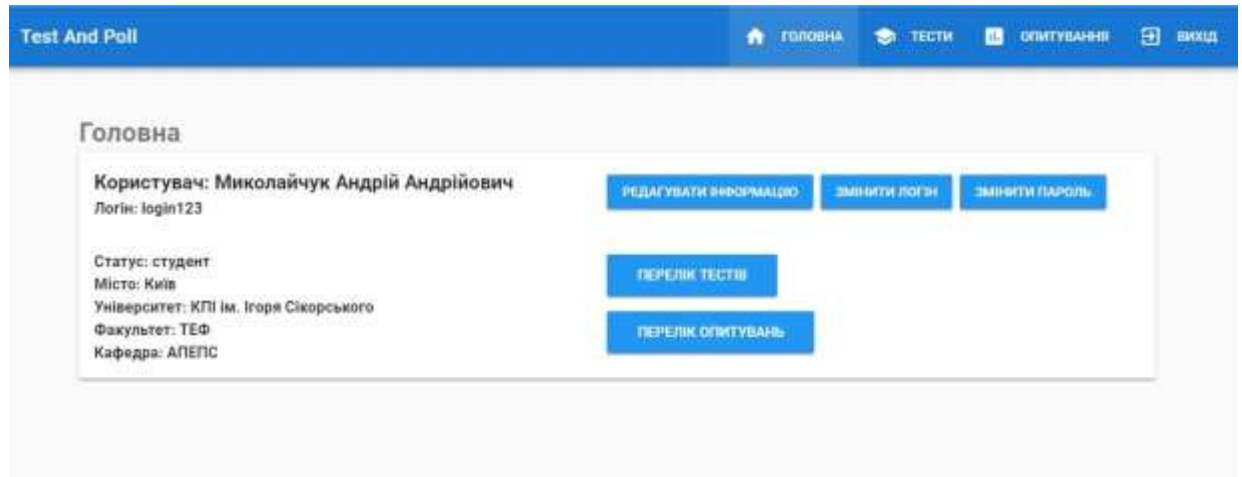


Figure 3.5 – Shows the system's primary menu.

The system's work points are also developed: "Tests," "Polls," and "Users."

You may check the results of successful tests, as well as create and pass new tests, using the "Tests" menu item (depending on the type of user).

You may check the results of surveys, as well as create new surveys and pass them on, using the menu option "Survey" (depending on the type of user).

The administrator can register new teachers and students, examine the list of registered teachers and students, edit their data, or remove their accounts using the "Users" menu item.

This menu item is put to the test.

Click the "Tests" button to get a list of passed tests (Figure 3.6).

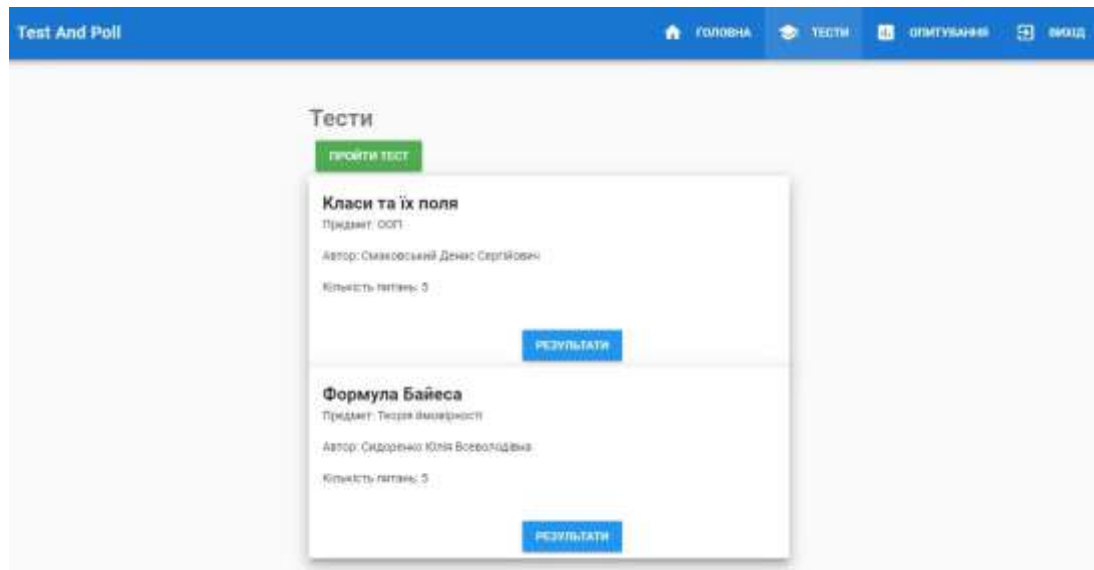


Figure 3.6 - Test menu item

Click the "Results" button on the list item to get the test results.

The teacher merely needs to click the "Create Test" button, which is exclusively available to him, to create a new test.

To begin a new test, the student must select the "Take the test" button, which is only accessible to him.

Menu item "Poll"

Click the "Survey" button to get a list of completed surveys (Figure 3.7).

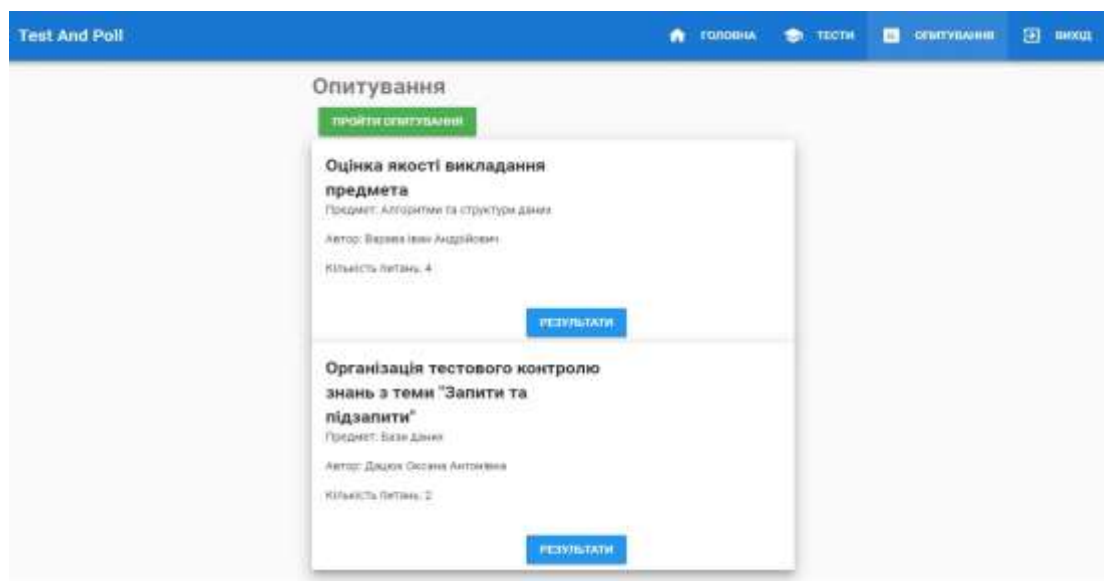


Figure 3.7 - Poll menu item

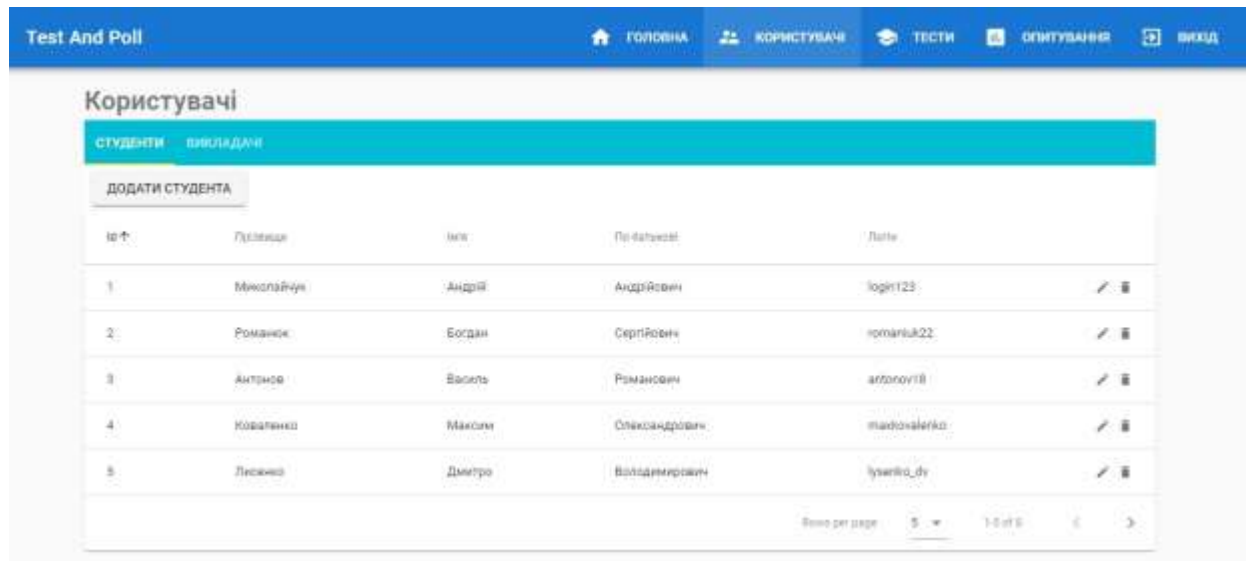
To see the survey's results, go to the list item and click "Results."

The teacher just clicks the "Create Survey" button, which is exclusively visible to him, to start a new survey.

To complete a new survey, the student must click the "Pass the survey" option, which is only visible to him.

Menu item "Users"

Click the "Survey" button to get a list of registered teachers and students (Figure 3.8). This list can only be viewed by the administrator, hence this button is only visible to him.



№	Прізвище	Ім'я	Прізвище	Логін	Дії
1	Миколайчук	Андрій	Андрійович	logint23	✎ 🗑
2	Романчук	Богдан	Сергієвич	romanchuk22	✎ 🗑
3	Антонюк	Василь	Романович	antonov18	✎ 🗑
4	Коваленко	Максим	Олександрович	maxkovaenko	✎ 🗑
5	Левченко	Дмитро	Володимирович	lysenko_dy	✎ 🗑

Figure 3.8 - The "Users" menu option.

The administrator must click the edit button next to the line to edit user details, and the delete button to delete the user account.

Make a quiz or a survey

Figure 3.9 depicts the procedure for developing a test (survey).

Figure 3.9 – Window enter test

You must click "Add Question" to add a new question to the test or survey.

On the list of created questions, click the "Edit" button to edit a question, and the "Delete" button to delete it.

When you've completed all of the test questions, click the "Create Test" button ("Create Poll").

Getting a good grade on a test or survey

To discover the necessary test or survey to pass, the student must fill out the form with all of the required information and then select the appropriate test or survey.

The test window is depicted in Figure 3.10. (survey).

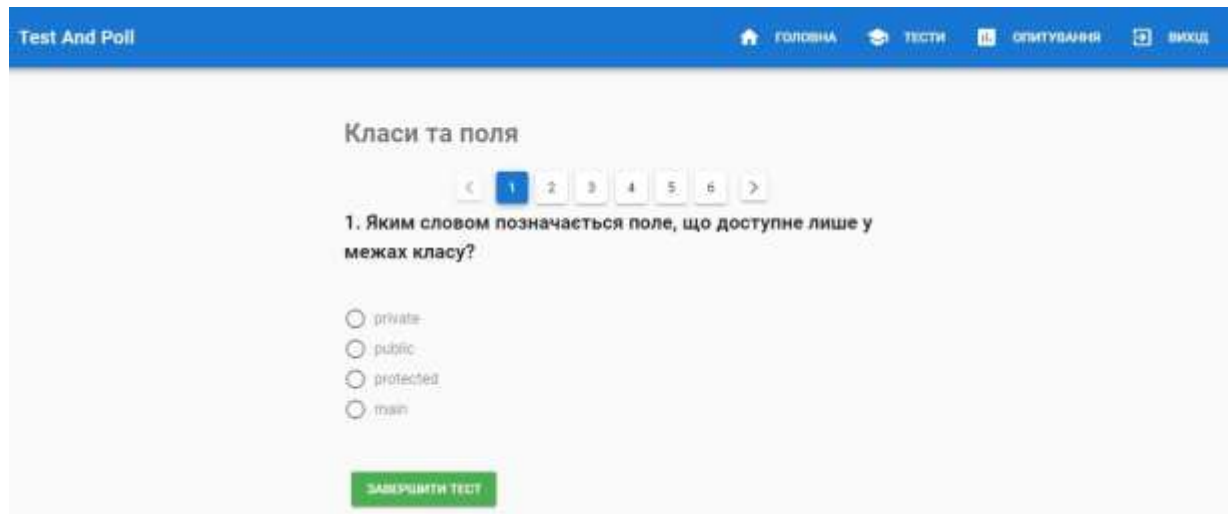


Figure 3.10 - Successful completion of the test (survey)

Simply select one of the answer options by tapping the radio button next to it to answer the question.

To move on to the next question, click on the question number.

Click the "Complete Test" button to finish the test.

4 OCCUPATIONAL HEALTH AND EMERGENCY SAFETY

4.1 Introduction

Occupational health or occupational safety, is a multidisciplinary field concerned with the safety, health, and well-being of workers. These terms also refer to the field's objectives.

Word related wellbeing bargains with all components of wellbeing and security within the work environment, with a solid center on essential avoidance of dangers," concurring to the World Health Organization (WHO). "A condition of add up to physical, mental, and social well-being, not as it were the nonattendance of affliction or inability," as characterized by the World Health Organization. Occupational wellbeing could be a multidisciplinary teach of medicine that centers on permitting individuals to do their occupations within the most beneficial conceivable way. It is in line with the advancement of word related wellbeing and security, which centers on anticipating harm from threats.

Given the appeal in the public eye for wellbeing and security arrangements at work dependent on solid data, word related security and wellbeing (OSH) experts should find their underlying foundations in proof-based practice. Another term is "proof informed independent direction". A functioning meaning of proof-based practice could be: proof-based practice is the utilization of proof from writing, and other proof-based sources, for exhortation and choices that favor the wellbeing, security, prosperity, and work capacity of laborers. Lastly, proof-based data should be coordinated with proficient ability and the laborers' esteems. Context oriented variables should be viewed as connected with regulation, culture, monetary, and specialized potential outcomes. Moral contemplations ought to be noticed.

Managers led their ventures how they figured fit to produce a benefit in the late nineteenth and mid-20th hundreds of years. Worker security and wellbeing were immaterial to them. In actuality, in conventional terms, absolutely no part of this made a difference. In the United States, injured specialists needed to go to court to get pay for their wounds. Workers were effectively deterred from going to court because of the significant expense of doing as such. Moreover, workers were seldom fruitful in light of the fact that, under customary law, assuming the representative knew about the perils of the gig or then again assuming that the wounds were brought about by the representative's or a colleague's carelessness, the business was not responsible.

Work environments under the locale are administered by your commonplace regulation. The regulation spots obligations on proprietors, bosses, laborers, providers, the independently employed and project workers, to build up and keep up with protected and solid working conditions. The regulation is managed by your commonplace regulation. Your authorities are liable for observing consistence.

4.2 Rights, duties and responsibilities of employers and workers during outbreak and emergencies

Maintaining an appropriate and functional workforce, as well as ensuring the continuity of emergency response and vital health services, requires protecting the health and safety of health-care employees and other emergency responders. Employers must be prepared to adapt their usual practice in consultation with workers, their representatives, and technical experts in an emergency situation such as an outbreak, chemical spill, or radiation release, where workplace risk changes rapidly, in order to achieve a reasonable balance of safety versus obligation to work.

Workers in the emergency response field, particularly health-care professionals, have a contractual obligation and a duty of care to deliver services that may expose

them to infections, toxins, injuries, and diseases. Despite their duty of care, emergency response professionals may have the right, depending on the national context, scenario, and practice, to remove themselves from a work situation that they have sufficient grounds to believe poses an urgent and serious threat to their lives or health.

Employers of emergency responders have a responsibility to ensure safe working conditions as well as the resources needed to execute acceptable OSH procedures.

Employers have a responsibility to:

- these personnel must be suitably trained, equipped, and protected;
- give them the ability and knowledge to execute OSH methodologies;
- give clear guidance on the working circumstances for these workers, what is expected of them, and the inherent risks of the scenario;
- give adequate psychological assistance, as well as put in place measures to promote healthy behaviors;
- offer fair compensation for the services supplied by these individuals in the form of risk premiums and insurance for them and their families, as well as disability benefits for those infected;
- collect information in a systematic manner to support ongoing monitoring and evaluation of the effectiveness of OSH programs in providing protection.

4.3 Strategies and tools for protecting occupational safety and health in emergencies and outbreaks

During scourges and crises, the administration frameworks approach gives a general structure to overseeing OSH hazards. Certain strategies, methodology, and instruments exist for the avoidance and control of OSH dangers and dangers inside this structure. These devices can be custom fitted to the flare-up or crisis circumstance

within reach. The "stepping stool of controls," the ICS, and disease counteraction and control measures are totally shrouded in this segment.

The Incident Command System (ICS) is a standardized on-scene incident management approach that allows responders to adopt an integrated organizational structure that is equal to the complexity and demands of any single incident or numerous incidents, regardless of jurisdictional boundaries. By establishing a reasonable span of control, the ICS enables integrated communication and planning. An ICS splits a disaster into five controllable functions: command, operations, planning, logistics, and finance and administration.

Organization structure of the ICS. The minimum ICS should consist of the following and can be expanded according to requirements:

- The Public Information Officer, Safety Officer, and Liaison Officer make up the command staff. They are directly responsible to the Incident Commander.
- The organizational level with functional responsibility for the key segments of incident management (operations, planning, logistics, finance/administration) is represented by sections. The section level is located between the branch and the Incident Commander in terms of organizational structure.
- Each sector is made up of smaller and smaller organizational units, such as a branch, division, group, unit, task force, strike force, and finally a single resource. A single resource is a single piece of equipment and its staff complement, or a pre-established crew or team of people with a designated work supervisor that can be deployed to respond to an incident.
- The ICS is created by identifying the primary tasks or functions that must be performed in order to respond to incidents efficiently. The demand for an organizational manager has grown as occurrences have become more complicated, challenging, and costly. The Incident Commander handles the organization, not the incident, in the ICS, especially in larger incidents.

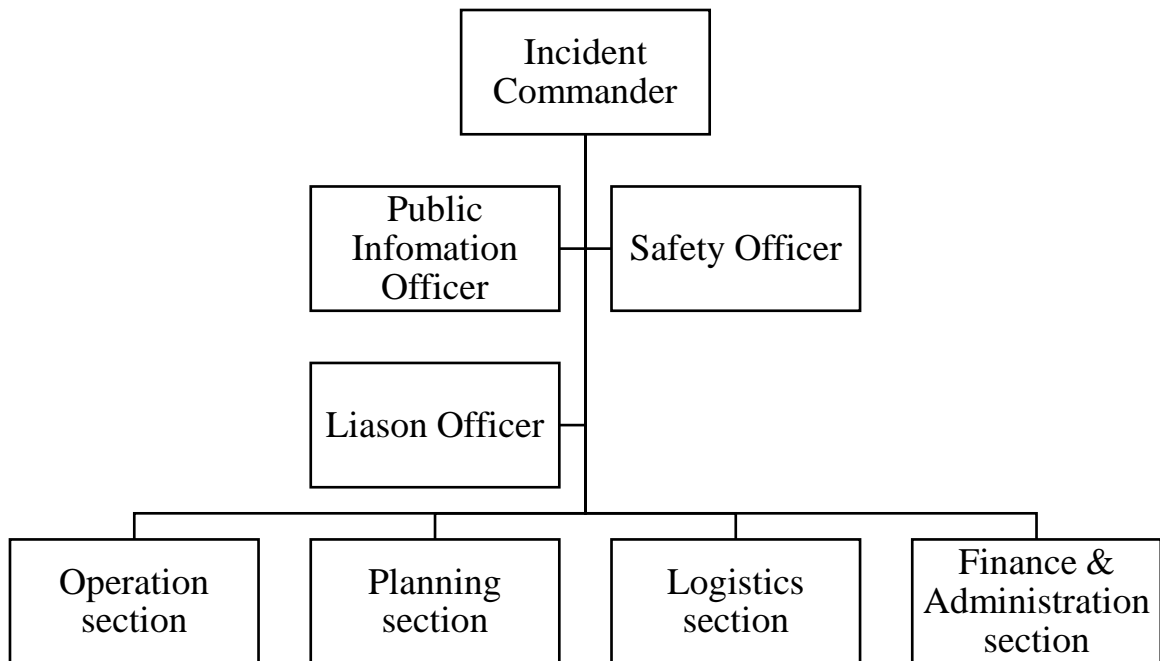


Figure 4.1 – Structure of Incident Command System

Roles and responsibilities:

- Command staffs are tasked with carrying out the staff responsibilities required to assist the Incident Commander. Interagency liaison, incident management, safety, and public communication are among these functions. Command staff jobs are created to delegate responsibility for critical operations that are not clearly listed in the general staff functions. In addition to those as required and assigned by the Incident Commander, these posts may include the Public Information Officer, Safety Officer, and Liaison Officer.

- The general staff is in charge of the ICS's operational aspects. The operations, planning, logistics, and finance/administration sectors are often part of the general staff.

The key responsibilities of the safety/OSH officer include:

- hazardous conditions must be identified and mitigated;
- guaranteeing that security messages are imparted and briefings are given;
- using emergency powers to halt and prevent dangerous activity;

- safety consequences are reviewed in the Incident Action Plan;
- appointing qualified specialists to assess unique threats.

4.4 Occupational safety and health controls

To manage the health and safety concerns posed by diverse hazards, strategies for both prevention and mitigation must be in place. The hierarchy of controls in occupational safety and health refers to the desired order of selecting control measures, from the most effective to the least effective. The basic principle is that it is always preferable to attempt to eliminate the hazard first. Where this is not possible, the hazard should be confined first at the source, then along the path, and finally at the person. Because each environment is unique, a workplace evaluation is required to identify hazards and propose management strategies.

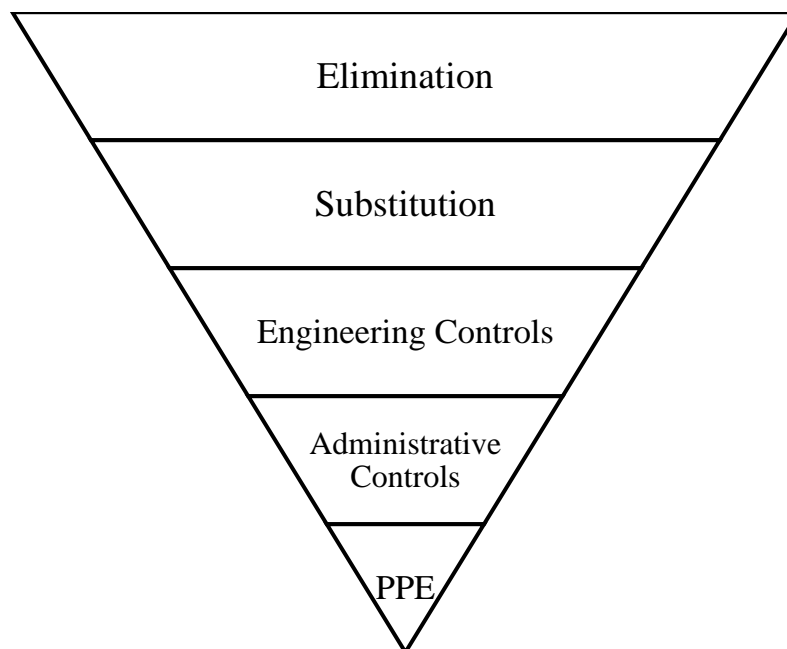


Figure 4.2 – Hierarchy of occupational safety and health controls

Where:

- Elimination; Physically remove the hazard;
- Substitution; Replace the hazard;
- Engineering Controls; Isolate people from the hazard;
- Administrative Controls; Change the way people work;
- PPE (Personal Protective Equipment); Protect the worker with personal protective equipment.

4.5 Conclusion of the chapter 4

Occupational safety and health (OSH), sometimes known as occupational health or occupational safety, is a multidisciplinary area that is concerned with worker safety, health, and well-being. Occupational health is a multidisciplinary branch of medicine that focuses on enabling people to perform their jobs in the most beneficial way possible. It is consistent with the advancement of online safety and security, which focuses on preventing harm from dangers.

Finally, evidence-based facts should be coordinated with professional ability and laborers' esteems. Contextual elements should be considered in relation to regulatory, cultural, monetary, and specialized potential outcomes. In reality, in traditional terms, none of this made a difference.

Places of work under the authority of the area are protected under the law. Maintaining an appropriate and functional workforce, as well as guaranteeing the continuity of emergency response and important health services, necessitates the protection of health-care professionals and other emergency responders' health and safety. Workers in the emergency response area, particularly health-care professionals, are contractually obligated and have a duty of care to provide services that may expose them to infections, poisons, injuries, and diseases. Employers of emergency responders are responsible for providing safe working conditions as well as the resources necessary

to carry out approved OSH practices. The administration frameworks technique provides a fundamental structure for supervising OSH dangers during scourges and crises. These gadgets can be tailored to the specific flare-up or crisis situation at hand. The Incident Command System (ICS) is a standardized on-scene incident management approach that enables responders to adopt an integrated organizational structure that is capable of handling the complexity and demands of any single incident or a series of incidents, regardless of jurisdictional boundaries. The ICS provides integrated communication and planning by establishing a suitable span of control.

The following should be included in the minimal ICS and can be expanded if needed:

- The command staff consists of the Public Information Officer, the Safety Officer, and the Liaison Officer.
- Sections represent the organizational level with functional responsibility for the essential segments of incident management (operations, planning, logistics, finance/administration). In terms of organizational structure, the section level is placed between the branch and the Incident Commander.
- Each sector is composed of progressively smaller organizational units, such as a branch, division, group, unit, task force, strike force, and, lastly, a single resource. The requirement for an organizational manager has increased as events have become more sophisticated, difficult, and expensive etc.

The safety/OSH officer's main responsibilities are as follows: To deal with the health and safety risks caused by various hazards, preventative and mitigation techniques must be in place. The core premise is that attempting to eliminate the hazard first is always preferable.

CONCLUSION

The systems that serve for the decision of set tasks have been explored during the study of existing organizational software and the conducting of tests and interrogations in the educational process.

The developed software package makes it possible to automate and speed up the testing and surveying processes.

A look at software system development approaches and tools. It is warranted to create a software system based on web technologies and constructed on a three-tier design. This increases the system's flexibility and convenience in both development and maintenance, as well as in use.

The correctness of the generated findings is confirmed by the outcomes of the test jobs, indicating that the system fits the requirements.

Teachers who develop tests or surveys, students who take them, and system administrators who can update information about teachers and students are all possible users of the system. The software is compatible with any operating system that has a browser that supports the current web standards and has persistent Internet access.

As a result, the practice has enhanced knowledge of many software development technologies. In addition, numerous software prototypes were constructed, each of which tackled a different part of the challenge and served as the foundation for the final product.

REFERENCES

1. Bykov VY, Lapinsky VV Methodological and methodical bases of creation and use of electronic means of educational purpose // Computer in school and family. - №3. - 2012. S. 3-6 .. 3.
2. Mayorov AN Theory and practice of creating tests for the education system / Mayorov AN - M.: Public education, 2000. - 352 p.
3. Adamenko OV, Dukhovna MM, Panchenko LF etc. Test tasks for knowledge control in the course "Computer Engineering and Technical Teaching Aids": Teaching Method, Manual / Ed. THEN. Kozlakova. - K.: VIPOL, 1996.-84 p.
4. Alekseychuk IS On the technology of creating a testing system / I.S. Alekseychuk // New learning technologies: Scientific and methodical collection. - K.: HMЦБД, 2000. - С.43-92.
5. Tetyakova NV Evaluation of the quality of the teacher's work on the basis of methods of multidimensional analysis of his activities / NV Tretyakova // Scientific and theoretical journal "Scientific notes of the University named after PF Lesgaft". - 2011. - №11 (81). - P. 151-155.
6. Vasilieva, E. Yu. Approaches to assessing the quality of the university teacher // University management: practice and analysis. - 2006. - № 2 (11). - WITH. 74-78.
7. What is REST? [Electronic resource]. - Access mode: <http://www.restapitutorial.com/lessons/whatisrest.html>.
8. Markus Egger - MVVM Survival Guide for Enterprise Architectures in Silverlight and WPF [Electronic resource]. - 2012. - Access mode: <https://www.packtpub.com/application-development/mvvm-survival-guide-enterprise-architectures-silverlight-and-wpf>.

9. Kate Jones. DOM Scripting: Web Design with JavaScript and the Document Object Model. / K. Jones - First, 2005. - 368 p.
10. Anthony Gore - Full-Stack Vue.js 2 and Laravel 5 [Electronic resource]. - 2015. - Access mode: <https://bit.ly/2OEODzR>.
11. Martin Fowler - GUI Architectures. Part 1 [Electronic resource]. - 2009. - Access mode: <https://bit.ly/2CvCk1e>.
12. Vue.js Material Component Framework - Vuetify.js [Electronic resource]. - 2016. - Access mode: <https://vuetifyjs.com>.
13. Dmitry Koterov, Alexey Kostarev PHP. In the original. / D. Koterov, A. Kostarev - St. Petersburg: BHV-Petersburg, 2005. - 1120 p.
14. Kolisnichenko DN Self-taught RNR 5 / DN Kolisnichenko - St. Petersburg: Science and Technology, 2007. - 640 p.
15. Maxim Kuznetsov, Igor Simdyanov PHP 5/6. / M. Kuznetsov, I. Simdyanov - St. Petersburg: BHV-Petersburg, 2009. - 1024 p.
16. Kuznetsov Maxim, Simdyanov Igor Object-oriented programming in PHP. / M. Kuznetsov, I. Simdyanov - St. Petersburg: BHV-Petersburg, 2007. - 608 p.
17. L. Atkinson, Z. Suraskin. PHP5. Professional library. / L. Atkinson, Z. Suraskin - M.: "Williams", 2006 - 543 p.
18. Scott Hawkins. Apache web server administration and e-commerce guide. / S. Hawkins. - M.: "Williams", 2001. - 336 p.
19. Hawkins S. Administration of the Apache Web server / S. Hawkins - M.: Williams, 2001. - 336 p.
20. Beaulieu A. - Learning SQL [Electronic resource]. - 2005. - Access mode: <http://shop.oreilly.com/product/9780596007270.do>.
21. Robert Sheldon, Joffrey Moye MySQL: Basic Course Beginning MySQL./ R. Sheldon, D. Moye - M.: "Dialectics" 2007. - 880 p.
22. MySQL. Directory. MySQL AB. - M.: "Williams", 2006 - 521 p.

23. Kuznetsov Maxim, Simdyanov Igor MySQL on examples. / M. Kuznetsov, I. Simdyanov - St. Petersburg: BHV-Petersburg, 2008. - 952 p.
24. Leon AG PHP 5. Professional Library / AG Leon - M .: Williams, 2006. - 944 p.

ANNEXES

Test viewing software module

```

<template>
  <v-container>
    <v-layout row>
      <v-flex xs12 sm6 offset-sm3>
        <h1 class="text--secondary mb3">Tests</h1>
        <v-btn
          :to="/tests/new"
        >Create a test</v-btn>
        <v-btn class="success" :to="/tests/search">To pass a test</v-btn>
        <v-card
          class="elevation-10 mb2"
          v-for="(test, i) in tests"
          :key="i"
        >
          <v-layout>
            <v-flex xs8>
              <v-card-text>
                <h2 class="text--primary">{{ test.name }}</h2>
                <p>Subject: {{ test.subject }}</p>
                <p>Author: {{ test.author }}</p>
                <p>Number of questions: {{ test.amountQuestions
                }}</p>
              </v-card-text>
              <v-card-actions>
                <v-spacer></v-spacer>
                <v-btn
                  class="info"
                  :to="/test/' + test.id + '/result"
                >Results</v-btn>
              </v-card-actions>
            </v-flex>
          </v-layout>
        </v-card>
      </v-flex>
    </v-layout>
  </v-container>
</template>

```



```

<script
>
export
default
{
data() {
return
{}
},
comput
ed: {
tests() {
return this.$store.getters.tests
}
}
}
</
sc
ri
pt
>

```

Survey viewer software module

```

<template>
  <v-container>
    <v-layout row>
      <v-flex xs12 sm6 offset-sm3>
        <h1 class="text--secondary mb3">poll</h1>
        <v-btn
          :to="/polls/new"
        >Create a poll</v-btn>
        <v-btn class="success">Take the survey</v-btn>
      <v-card
        class="elevation-10 mb2"
      v-for="(poll, i) in polls"
        :key="i"
      >
        <v-layout>

```

```

    <v-flex xs8>
      <v-card-text>
        <h2 class="text--primary">{{ poll.title }}</h2>
        <p>Subject: {{ poll.subject }}</p>
        <p>Author: {{ poll.author }}</p>
        <p>Number of questions: {{ poll.amountQuestions
}}</p>
      </v-card-text>
      <v-card-actions>
        <v-spacer></v-spacer>
        <v-btn
class="info"
          :to="/poll/" + poll.id"
          >Results</v-btn>
        </v-card-actions>
      </v-flex>
    </v-layout>
  </v-card>
</v-flex>
</v-layout>
</v-container>
</template>
<script>
export
default {
data() {
return {}
}
computed:
{
polls() {
return this.$store.getters.polls
}
}
}
}
</
sc
ri

```

pt

>

Test module software module

<template>

<v-container>

<v-layout row v-if="!loading">

<v-flex xs12 sm6 offset-sm3>

<h1 class="text--secondary mb-3">New test</h1>

<v-form

ref="form" v-

model="valid">

<v-text-field

name="title"

label="Name*"

type="text"

required

:rules="[v => !!v || This field is required]"

v-

model="title"></v-text-field>

<v-text-field

name="amount of Questions"

label="Number of questions*"

type="number"

min="1"

step="1"

required

:rules="[v => !!v || This field is required]"

v-

model="amountQuestions"></v-text-field>

<EditTestQuestion :question="question"/>

</v-form>

<v-layout>

<v-flex xs12>

<v-card

class="elevation-10 mb2"

v-for="(question, i) in questions"

:key="i"

>

<v-layout>

<v-flex xs8>

<v-card-text>

```

        <h2>{{i + 1}}) {{question.name}}</h2>
        <p></p>
        <p>A) {{question.variantA}}</p>
        <p>B) {{question.variantB}}</p>
        <p>C) {{question.variantC}}</p>
        <p>D)                {{question.variantD}}</p>
    </v-card-text>

    <v-card-actions>
        <v-btn class="warning">Edit</v-btn>
        <v-btn class="error">Remove</v-btn>
    </v-card-actions>
</v-flex>
</v-layout>
</v-card>
<v-spacer></v-spacer>
<v-btn
:disabled="!valid"
class="success"
    @click="createTest">create test</v-btn>
    </v-flex>
    </v-layout>
    </v-flex>
</v-layout>
<v-layout v-else>
    <v-progress-circular :value="100"></v-progress-circular>
</v-layout>
</v-container>
</template>

<
s
cr
ip
t
>
    import EditTestQuestion from
"./TestQuestions/EditTestQuestion" import axios
from "axios"

```

```

    export default {
  data() {      return {
    title:      "",
    amountQuestions: '1',
    select:      null,
    subjects:    [
      'Item1',

      'Item2'    ],
    valid: false,

    questions: []
  }    },
  components: {
    EditTestQuestion
  },
  computed: {
    loading() {
      return this.$store.getters.loading
    }
  },
  mounted() {
    axios("http://testandpoll.ua/api.php?action=read&obj=questions")
      .then(response => {
        this.questions = response.data;
      })
      .catch(error => {
      })
  },
  methods: {
    createTest() {

      if(this.$refs.form.validate()) {
        const test = {
          title:
            this.title,
          select:
            this.select,
          amountQuestions: this.amountQuestions

```

```

    }
  },
}
}
</script>

```

Software module for finding a test to pass

```

<template>
  <v-container>
    <v-layout row v-if="!loading">
      <v-flex xs12 sm6 offset-sm3>
        <h1 class="text--secondary mb-3">New test</h1>
        <v-form
ref="form"          v-
model="valid">
  <v-text-field
name="title"
label="teacher*"
type="text"
required
          :rules="[v => !!v || 'this field is required']"          v-
model="title"></v-text-field>
        <v-text-field
name="amountQuestions"
label="Предмет*"
type="text"
required
          :rules="[v => !!v || 'this field is required']"          v-
model="amountQuestions"></v-text-field>

```

```

        </v-form>
    <v-card
        class="elevation-10 mb2"
        v-for="(test, i) in tests"
        :key="i"
    >
        <v-layout>
            <v-flex xs8>
                <v-card-text>
                    <h2>Name</h2>
                    <p>Topic</p>
                    <p>Author</p>
                    <p>Amount of Questions</p>
                </v-card-text>
            </v-flex>
        </v-layout>
    </v-card>
</v-flex>
</v-layout>
<v-layout v-else>
    <v-progress-circular :value="100"></v-progress-circular>
</v-layout>
</v-container>
</template>
<script>
export
default {
data() {
return {
title: ",

```

```

amountQu
estions: ",
select:
null,
subjects: [
    'Item1',

'Item2'    ],
valid: false
    }
},
component
s: {

},
    computed: {
loading() {
    return this.$store.getters.loading
    },

    tests() {
    return this.$store.getters.tests
    }

},
    methods: {
createTest() {

```



```

if(this.$refs.form.validate()) {
  const test = {
    title:
    this.title,
    select:
    this.select,
    amountQuestions: this.amountQuestions
  }
},
}
}
</script>

```

Database query management software module

```

<?php
$db = mysql_connect('localhost', 'root', '') or die("");
mysql_select_db('test_and_poll') or die("");
$res = array('error', false);

$action = 'read';
$obj = 'tests';
if(isset($_GET['action'])) {
  $action = $_GET['action'];
}
if(isset($_GET['obj'])) {
  $obj = $_GET['obj'];
}

if ($action == 'read' && $obj == 'tests') {
  $result = mysql_query("SELECT * FROM `tests`");
  $tests = array();

```

```

        while ($row = mysql_fetch_assoc($result)){
array_push($users, $row);
        }
        $res['tests'] = $tests;
echo
json_encode($res['tests']);

}
    if ($action == 'read' && $obj ==
'polls') {
        $result =
mysql_query("SELECT * FROM
`polls`");
        $polls = array();

        while ($row = mysql_fetch_assoc($result)){
array_push($users, $row);
        }
        $res['polls'] = $polls;
echo
json_encode($res['polls'])
;

}
    if ($action == 'create' && $obj == 'tests') {
        $name = $_POST['name'];
        $subject = $_POST['subject'];

        var_dump($_POST);

        $result = mysql_query("INSERT INTO `tests`(`name`, `subject`)
VALUES ('$name', '$subject') ");
        if ($result) {
            $res['message'] = "Test Added successfully";
            $res['name'] = $name;
            $res['subject'] = $subject;
        } else{
            $res['error'] = true;
            $res['message'] = "Insert Test fail";
        }
    }

```

```

    echo json_encode($res);
}
if ($action == 'create' && $obj == 'polls') {
    $name = $_POST['name'];
    $subject = $_POST['subject'];

    var_dump($_POST);

    $result = mysql_query("INSERT INTO `polls`(`name`, `subject`)
VALUES ('$name', '$subject') ");    if ($result) {
        $res['message'] = "Poll Added successfully";
        $res['name'] = $name;
        $res['subject'] = $subject;
    } else{
        $res['error'] = true;
        $res['message'] = "Insert Poll fail";
    }
    echo json_encode($res);
}
if ($action == 'search' && $obj == 'tests') {
    $name = $_POST['name'];
    $subject = $_POST['password'];

    $result = mysql_query("SELECT * FROM `tests` WHERE `name` =
'$name' AND `subject` = '$subject'");    if ($result) {        $result = [
        'name' => $result['name'],
        'subject' => $result['subject']
    ];
    $res['message'] = "Test Search success";
    $res_int = mysql_numrows($result);
} else{
    $res['error'] = true;
    $res['message'] = "Test Search failed";
}
echo json_encode($result);
}

```

```
if ($action == 'search' && $obj == 'polls') {
    $name = $_POST['name'];
    $subject = $_POST['password'];

    $result = mysql_query("SELECT * FROM `polls` WHERE `name` =
'$name' AND `subject` = '$subject'");    if ($result) {        $result = [
        'name' => $result['name'],
        'subject' => $result['subject']
    ];
    $res['message'] = "Poll Search success";
    $res_int = mysql_numrows($result);
} else{
    $res['error'] = true;
    $res['message'] = "Poll Search failed";
}
echo json_encode($result);
}
?>
```