NFR:

Requirement specification	NFR-003
Requirement Name	Escalability
Description of the requirement	The system will be scalable, capable of handling a large amount of data and allowing the use and collaboration of multiple masters, other systems can be implemented if necessary.

Test Planning

Number of participants: This type of testing often involves simulating a large number of users or transactions to stress test the system. The number of participants in scalability tests can range from several tens to hundreds or even thousands, depending on the size and complexity of the system being tested.

Recruitment of participants: In scalability tests, participants can be randomly or intentionally selected, depending on the objective of the test and the target population. It is also important to note that in some cases, automated tools or simulations may be used instead of real participants to perform scalability tests. These tools can generate a simulated workload for the system or product, which can help scale the test without requiring a large number of real participants.

Expected skills and knowledge: Participants are expected to have a solid understanding of attention deficit hyperactivity disorder (ADHD) and how it affects children in the classroom. They must also have experience teaching children with ADHD, strong technical knowledge of web technologies, scalability testing skills, and effective communication to present and explain results to a multidisciplinary team.

Tasks:

- Identification of requirements: The participants identify the requirements and specific needs of the web page, taking into account the content, functionality, characteristics and specific needs of the users.
- Design of the architecture: The participants design the architecture of the web page, including the distribution of servers, the configuration of networks and the implementation of caching and load balancing systems.
- Load Simulation: Participants generate simulated traffic to simulate user behavior on the website. This involves carrying out stress tests to assess the performance of the website under extreme traffic loads.
- Performance monitoring: Participants monitor the performance of the web page during the scalability test, measuring response times, latency and throughput of the web page.

- Analysis of results: Participants analyze the data collected during the scalability test to identify possible bottlenecks, resource limitations and other problems that may affect the performance of the web page.
- Solution Proposal: Participants propose solutions to improve the performance of the web page, which may include the implementation of code improvements, infrastructure changes, resource optimization and server configuration adjustments.
- Results report: The participants present the results of the scalability test in a detailed report, explaining the findings and recommending the proposed solutions to improve the performance of the website. In our case, the participants can also offer specific recommendations on how to improve the usability, accessibility and effectiveness of the website in relation to the needs of children with ADHD and their teachers.

Test Scenarios:

- Basic load scenario: In this scenario, the scalability of the application is evaluated under a moderate workload, simulating the access of several concurrent users to the web page. Participants could be invited to search and access different resources and activities, while the response speed and overall performance of the application is measured.
- Heavy Load Scenario: In this scenario, the scalability of the application is evaluated under extreme workload, simulating access by many users simultaneously. Participants may be invited to access different sections of the website, perform searches and access content at different times. The response speed and the overall performance of the application are measured.
- Continuous load scenario: In this scenario, the scalability of the application is evaluated under a continuous workload, simulating the access of users who remain on the web page for long periods of time. Participants could be invited to access different resources and activities and stay on the web page for an extended period of time, while the overall performance of the application is measured.
- Search Scenario: In this scenario, the scalability of the application to handle intensive searches is evaluated. Participants could be invited to perform different searches for content on the web page, while the response speed and overall performance of the application is measured.
- Video Access Scenario: In this scenario, the scalability of the application to handle access to video content is evaluated. Participants could be invited to access different videos and measure the overall performance of the app while the videos are playing.
- Interactive Activity Access Scenario: In this scenario, the scalability of the application to handle access to interactive activities is evaluated. Participants could be invited to access different activities and measure the overall performance of the application while participating in the activities.

Timings:

- Test preparation: 1-2 days
- Initial testing and optimization: 2-3 days
- Load test: 1-2 days
- Stress test: 1 day
- Results analysis: 2-3 days
- Results report: 1-2 days

In total, the scalability test is expected to take between 8 and 13 days. It should be noted that these times are only an estimate and may vary depending on the specific circumstances of the project.

Instruments, Tools, and Materials:

- Load and stress test tools: to simulate a large number of users simultaneously accessing the web page and measure its response capacity and load time.
- Performance monitoring tools: to measure server and database performance and detect bottlenecks and scalability issues.
- User behavior monitoring instruments: to carry out usability tests and measure how users interact with the web page.
- Data analysis tools: to analyze the data collected during the test and present it in a clear and concise way.
- Equipment and devices for tests on different platforms and browsers: to ensure that the website is compatible and works well on different operating systems, browsers and devices.
- Documentation and test guides: to guide participants in the execution of the test and document the results of the test.
- Communication equipment and tools: to facilitate communication between members of the team conducting the test and to communicate the results to relevant stakeholders.

Usability Metrics

Page Load Time: Measures the time it takes for the web page to fully load. This metric can be evaluated at different levels, such as:

> *Ideal charging time:* less than 2 seconds.
> *Acceptable charging time:* between 2 and 4 seconds.
> *Unacceptable loading time:* more than 4 seconds.

Page Size: Measures the size of the web page in bytes or megabytes. This metric can be evaluated at different levels, such as:

> *Ideal size:* less than 1 MB.
> *Acceptable size:* between 1 and 2 MB.
> *Unacceptable size:* more than 2 MB.

Amount of concurrent traffic: Measures the number of users that can access the web page at the same time without affecting performance. This metric can be evaluated at different levels, such as:

> *Ideal traffic:* up to 100 simultaneous users.
> *Acceptable traffic:* between 100 and 500 simultaneous users.
> *Unacceptable traffic:* more than 500 concurrent users.

Vertical Scalability: Measures the ability of the web page to handle more load by increasing server resources (such as RAM or processor). This metric can be evaluated at different levels, such as:

> *Ideal vertical scalability:* The web page can easily handle more load by increasing the server resources.
> *Acceptable vertical scalability:* The web page can handle more load by increasing the server resources, but with limitations.
> *Unacceptable vertical scalability:* The web page cannot handle more load by increasing the server resources.

Horizontal Scalability: Measures the website's ability to handle more load by increasing the number of servers. This metric can be evaluated at different levels, such as:

> *Ideal Horizontal Scalability:* The website can easily handle more load by increasing the number of servers.
> *Acceptable horizontal scalability:* The website can handle more load by increasing the number of servers, but with limitations.
> *Unacceptable horizontal scalability:* The website cannot handle more load by increasing the number of servers.